VOLUME 1

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

As lead Federal Agency pursuant to the National Environmental Policy Act of 1969

FINAL
ENVIRONMENTAL IMPACT STATEMENT

GNOSS FIELD AIRPORT
PROPOSED EXTENSION OF RUNWAY 13/31
Novato, Marin County, California

This Final Environmental Impact Statement (FEIS) addresses the potential environmental impacts from the extension of Runway 13/31 proposed by Marin County and various other development alternatives along with the No Action Alternative for Gnoss Field Airport, Marin County, California. The proposed action includes: Extending Runway 13/31 from 3,300 feet to a total length of 4,400 feet while maintaining the 75-foot width of the existing runway. Extending the parallel taxiway to the full length of the runway. Extending the existing Runway Safety Area (RSA) along the sides of Runway 13/31 to maintain the existing RSA width of 120 feet centered on the runway centerline. Extending the RSA to 240 feet long beyond each end of Runway 13/31 to meet current FAA B-I (small) airport design standards. Realigning of drainage channels to drain the extended runway and taxiway. Extending existing levees to protect the extended runway and taxiway from flooding. Install and/or relocate navigational aids that pilots use to land at the Airport for use with the extended runway. Acquire 0.1 acre of land to obtain a standard RSA. The Final EIS has been prepared pursuant to the following public law requirements: Section 102(2)(c) of the National Environmental Policy Act of 1969, and Section 509(b)(5) of the Airport and Airway Improvement Act of 1982, as amended.

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GENERAL INFORMATION ABOUT THIS DOCUMENT

WHAT'S IN THIS DOCUMENT? This Final Environmental Impact Statement (EIS) (Volume 1) was prepared by the Federal Aviation Administration (FAA). The Final EIS examines the potential environmental impacts of two proposed development alternatives to extend the existing runway at Gnoss Field Airport, Novato, Marin County, California and a No Action Alternative. Marin County previously released a Final Environmental Impact Report (EIR) (Volume 2) for this project on November 8, 2013 to meet California Environmental Quality Act (CEQA) requirements. Volume 3 includes Technical Appendices for the Final EIS and Public Comments and Responses to Comments on the Draft EIS/EIR. Alternative B, Extend Runway to the Northwest by 1,100 Feet, is the FAA's preferred alternative in the EIS and Marin County's preferred alternative in the EIR.

BACKGROUND. A Notice of Intent to prepare an EIS was published in the Federal Register on July 11, 2008. Scoping Meetings for agencies and the public were held on August 14, 2008 to provide an opportunity to comment on the scope of environmental issues to be addressed in the Draft EIS and Draft EIR. The Draft EIS and Draft EIR were released on December 9, 2011. A Public Hearing on the Draft EIS and Draft EIR was conducted on January 10, 2012 at the Marin County Civic Center Board of Supervisors Chambers, San Rafael, California. The comment period for the Draft EIS and Draft EIR was open from December 9, 2011 to February 6, 2012. Marin County accepted public comment on its Final EIR from November 8, 2013 to December 9, 2013. Marin County held an additional public hearing and certified the Final EIR as meeting CEQA requirements on February 11, 2014. Notices of these opportunities to comment on the EIS and EIR were sent to individuals and organizations who expressed interest in commenting on the proposed project and also published in one local newspaper.

The document presented herein represents the Final EIS for the federal decision-making process, in fulfillment of FAA's policies and procedures relative to NEPA and other related federal requirements. Copies of the document are available for inspection at various libraries in Marin County, Gnoss Field Airport, at the FAA San Francisco Airports District Office in Brisbane, California, and at the FAA Western-Pacific Region Office in Hawthorne, California. The addresses for these locations are provided in Chapter 7 of this Final EIS. Some copies of the Final EIS have been distributed on compact disk to conserve environmental resources. Full printed versions of this EIS and EIR are available at the Marin County libraries and FAA offices.

WHAT HAPPENS AFTER THIS? The FAA may issue a Record of Decision (ROD) 30 days after distribution of this Final EIS to the public. Issuance of a ROD would complete National Environmental Policy Act requirements for the project pursuant to Title 40 Code of Federal Regulations, § 1506.10. The project may begin as funds become available.

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ACRONYMS

The following is a list of acronyms used in this EIS.

069	Petaluma Municipal Airport
0Q3	Sonoma Valley Airport
3D	Three-Dimensional
AC	Advisory Circular
ACHP	Advisory Council on Historic Preservation
AGL	Above Ground Level
AIM	Aeronautical Information Management
AIP	Airport Improvement Program
ALP	Airport Layout Plan
ANCA	Airport Noise and Capacity Act of 1990
APC	Napa County Airport
APE	Area of Potential Effect
APU	Auxiliary Power Unit
AQCR	Air Quality Control Region
ARDF	Airport Research and Development Foundation
ARFF	Aircraft Rescue and Fire Fighting
ASA	Airport Service Area
ASCE	American Society of Civil Engineers
ASNA	Aviation Safety and Noise Abatement Act
AST	Aboveground Storage Tank
ATC	Air Traffic Control
ATCT	Airport Traffic Control Tower
AvGas	Low-lead aviation gasoline
BAAQMD	Bay Area Air Quality Management District
BAT	Best Available Technology Economically Achievable
BCDC	San Francisco Bay Conservation and Development Commission
BCT	Best Conventional Pollutant Control Technology
BMPs	Best Management Practices
BOD	Biochemical Oxygen Demand
BTU	British Thermal Units
BUSTR	The Bureau of Underground Storage Tanks Regulations
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Caltrans	California Department of Transportation
CCR	California Code of Regulations
CDFG	California Department of Fish and Game - as of January 1, 2013 the California Department of Fish and Game changed its name to the California Department of Fish and Wildlife (CDFW). For consistency the acronym CDFG is used throughout this Final EIS.
CEPA	California Environmental Protection Agency
CESA	California Endangered Species Act
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act

ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CGS	California Geological Survey
CH_4	Methane
CHP	California Highway Patrol
CIWMB	California Integrated Waste Management Board
CIWMP	California Integrated Waste Management Plan
CNDDB	California Natural Diversity Data Base
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	Carbon Monoxide
CO_2e	Carbon Dioxide Equivalencies
COD	Chemical Oxygen Demand
CRHR	California Register of Historic Resources
Cu	Copper
CWA	Clean Water Act (Federal Water Pollution Control Act, as amended)
CZMA	Coastal Zone Management Act
CY	Cubic Yards
Day	7:00 am to 9:59 pm
dB	Decibel
dBA	A-weighted decibel
DOT	Department of Transportation
DNL	Day-Night Average Sound Level
DSA	Detailed Study Area
DVO	Gnoss Field Airport
EA	Environmental Assessment
EDDA	Environmental Due Diligence Audits
EDMS	Emission & Dispersion Modeling System
EDR	Environmental Data Resources
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Federal Endangered Species Act
FAA	Federal Aviation Administration
FBO	Fixed-Base Operator
FEMA	Federal Emergency Management Agency
FICON	Federal Interagency Committee on Noise
FICUN	Federal Interagency Committee on Urban Noise
FIGR	Federated Indians of Graton Rancheria
FIRM	Flood Insurance Rate Maps
FPPA	Farmland Protection Policy Act
FY	Fiscal Year

ACRONYMS

GA	General Aviation
GHG	Greenhouse Gas
GIS	Geographic Information System
GPS	Global Positioning System
GSA	General Study Area
GSE	Ground Support Equipment
H_2O	Water Vapor
HAF	Half Moon Bay Airport
HAP	Hazardous Air Pollutant
HST	Central Valley High-Speed Train
HSWA	Hazardous and Solid Waste Amendments of 1984
HUD	U.S. Department of Housing and Urban Development
HVAC	Heating, Ventilating, and Air Conditioning
IFR	Instrument Flight Rules
ILS	Instrument Landing System
INM	Integrated Noise Model
IPCC	Intergovernmental Panel on Climate Control
ISR	Indirect Source Review
Jet A	Jet fuel
kWh	Kilowatt Hours
Leq	Equivalent Sound Level
Lmax	Maximum Noise Level
LL	Low-Lead
LOC	Localizer
LOS	Level of Service
LSAA	Lake and Streambed Alteration Agreement
LTO	Landing and Takeoff Cycle
LWCA	Land and Water Conservation Act
MA	Metropolitan Area
MBTA	Federal Migratory Bird Treaty Act
MBTRA	Migratory Bird Treaty Reform Act
MBTU	Million British thermal units
MCP	Marin Countywide Plan of 2007
MGD	Million Gallons per Day
mg/L	Milligrams per liter
MOA	Memorandum of Agreement
MMCF	Million Cubic Feet
MMRP	Mitigation Monitoring and Reporting Program
MSA	Metropolitan Statistical Area
MSL	Mean Sea Level
MSWLF	Municipal Solid Waste Landfill Units
MTOW	Maximum Take Off Weight
MW	Megawatts
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission

ACRONYMS

NAVAIDs	Navigational Aids
NCDC	National Climatic Data Center
NCRA	North Coast Rail Authority
NEM	Noise Exposure Map
NEPA	National Environmental Policy Act of 1969
NFA	No Further Action
NFD	Novato Fire District
NHPA	National Historic Preservation Act
Ni	Nickel
Night	10:00 pm to 6:59 am
NLR	Noise Level Reduction
NMFS	National Marine Fisheries Service
NMWD	North Marin Water District
NOAA	National Oceanic and Atmospheric Administration
NOD	Notice of Determination
NOI	Notice of Intent
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NOP	Notice of Preparation
NPDES	National Pollution Discharge Elimination System
NPIAS	National Plan of Integrated Airport Systems
NPL	National Priorities List
NRC	National Response Center
NRCS	Natural Resources Conservation Service
NRHP	National Registry of Historic Places
NRI	Nationwide Rivers Inventory
NSD	Novato Sanitary District
NSHMP	National Seismic Hazard Mapping Project
NWSFO	National Weather Service Forecast Office
O_3	Ozone
O&D	Origin & Destination (passengers)
OAG	Official Airline Guide
OHWM	Ordinary High Water Mark
OTR	Ozone Transport Region
P	Phosphorous
PAPI	Precision Approach Path Indicator
Pb	Lead
PFC	Passenger Facility Charges
PG&E	Pacific Gas & Electric
PM	Particulate Matter (PM_{10} & $PM_{2.5}$)
PPA	Pollution Prevention Act
RCRA	Resource Conservation and Recovery Act
RHA	Rivers and Harbors Act
RLI	Redwood Landfill and Recycling Center, Inc.
ROA	Record of Approval (issued by FAA on a Part 150 Noise Compatibility Program)
ROD	Record of Decision (issued by FAA on an EIS)

ACRONYMS

ROG	Reactive Organic Gases
ROWD	Report of Waste Discharge
RPZ	Runway Protection Zone
RQ	Reportable Quantity
RSA	Runway Safety Area
RVR	Runway Visual Range
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SCA	Stream Conservation Area
SCWA	Sonoma County Water Agency
SEI	Structural Engineering Institute
SEL	Sound Exposure Level
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SFO	San Francisco International Airport
SHPO	State Historic Preservation Office
SIC	Standard Industry Classification
SIP	State Implementation Plan
SMART	Sonoma-Marin Area Rail Transit District
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxide
SPCC	Oil Spill Prevention Control and Countermeasure Program
SSURGO	Soil Survey Geographic
STS	Charles M. Schulz Sonoma County Airport
SWMAC	Solid Waste Management Advisory Council
SWMM	Stormwater Management Model
SWMMD	Solid Waste Management Districts
SWMMP	Stormwater Management Master Plan
SWPPP	Stormwater Management Pollution Prevention Plan
SWRCB	State Water Resources Control Board
SWWTP	Southerly Wastewater Treatment Plan
TAC	Toxic Air Contaminants
TAF	Terminal Area Forecast (prepared by the FAA)
TBD	To Be Determined
THPO	Tribal Historic Preservation Office
TIP	Transportation Improvement Program
TKN	Total Kjeldahl Nitrogen
TOFA	Taxiway Object Free Areas
TN	Total Nitrogen
TOC	Total Organic Carbon
TOG	Total Organic Gases
TP	Total Phosphorous
TPH	Total Petroleum Hydrocarbon
TSCA	Toxic Substances Control Act of 1976
TSS	Total Suspended Solids
UCERF	Uniform California Earthquake Rupture Forecast
USACOE	U.S. Army Corps of Engineers

ACRONYMS

USC	U.S. Code
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USFWCA	U.S. Fish and Wildlife Coordination Act
USGS	U.S. Geological Survey
UST	Underground Storage Tank
VA	Department of Veterans Affairs
VASI	Visual Approach Slope Indicator
VFR	Visual Flight Rules
VOC	Volatile Organic Compounds
WCA	Water Conservation Areas
WDR	Waste Discharge Requirement
WMI	Waste Management Incorporated
Zn	Zinc

GLOSSARY OF TERMS

Air Route Traffic Control Center (ARTCC or Center) – A ***Federal Aviation Administration*** facility established to provide ***airport traffic control*** service to aircraft operating on ***Instrument Flight Rules*** flight plans within ***controlled airspace***, principally during the en route phase of flight. When equipment capabilities and controller workload permit, certain advisory and assistance services may be provided to ***Visual Flight Rules*** aircraft.

Air Taxi Aircraft – A term no longer used by the ***Federal Aviation Administration***, though still used by the U.S. Department of Transportation (USDOT). The *Federal Aviation Administration* uses the term *"on demand"* to describe those operations formerly described as "air taxi."

Air Traffic – Aircraft operating in the air or on an airport surface, exclusive of loading ramps and parking areas.

Air Traffic Control (ATC) – An FAA service operated for the public, to ensure adequate separation of aircraft and to promote the safe, orderly, and expeditious flow of air traffic. The air traffic facility with jurisdiction over mapped and designated airspace may authorize aircraft to proceed under specified traffic conditions within ***controlled airspace***.

Airport Traffic Control Tower (ATCT) – An ***airport traffic control*** facility established on an airport to provide for safe, orderly, and expeditious flow of air traffic arriving at and departing from an airport, including airport surface areas such as runways and taxiways.

Air Traffic Service (ATS) Routes – "ATS route," a generic term, includes "VOR Federal airways," "colored Federal airways," "alternate airways," "jet routes," "Military Training Routes," "named routes," and "RNAV routes." The term "ATS route" serves as an overall title for listing the types of routes that comprise the United States route structure.

Aircraft Approach Category – A grouping of aircraft based on a speed calculation that takes into account the stall speed in the landing configuration at maximum gross landing weight. An aircraft must fit only one category; its category determines speed minimums that must be observed for various maneuvers. For example, an aircraft which falls in *Category A,* but is circling to land at a speed in excess of 91 knots, must use the approach *Category B* minimums when circling to land. The categories are: *Category A* - Speed less than 91 knots; *Category B* - Speed 91 knots or more but less than 121 knots; *Category C* - Speed 121 knots or more but less than 141 knots; *Category D* - Speed 141 knots or more but less than 166 knots; *Category E*- Speed 166 knots or more. (*See* 14 CFR Part 97.)

Aircraft Classes – For the purposes of wake turbulence aircraft separation minimums, ATC classifies aircraft as (a) *Heavy* - Aircraft capable of takeoff weights of more than 255,000 pounds whether or not they are operating at this weight during a particular phase of flight, (b) *Large* - Aircraft of more than 41,000 pounds, maximum certificated takeoff weight, up to 255,000 pounds, or (c) *Small* - Aircraft of 41,000 pounds or less maximum certificated takeoff weight.

Airman's Information Manual (AIM) – A publication containing basic flight information and ***air traffic control*** procedures, designed primarily as a pilot's information and instructional manual for use in the ***National Airspace System***.

Airport Departure Rate – A dynamic parameter specifying the number of aircraft per hour that can depart from an airport and be accepted into the airspace.

Airport Elevation – The highest point on an airport's usable runways, expressed in feet above ***mean sea level***.

Airport Improvement Program (AIP) – A Federal funding program for airport improvements. AIP is periodically reauthorized by Congress with funding appropriated from the Aviation Trust Fund. Proceeds to the Aviation Trust Fund are derived from excise taxes on airline tickets, aviation fuel, etc.

Airport Layout Plan (ALP) – A scaled drawing of existing and proposed land and facilities necessary for the operation and development of the airport. The ALP shows boundaries and proposed additions to all areas owned or controlled by the airport operator for airport purposes, the location and nature of existing and proposed action, and the location on the airport of existing and proposed non-aviation areas and improvements thereon.

Airport Operations – The total takeoffs (departures) and landings (arrivals) from an airport.

Airport Reference Code (ARC) – A coding system used to relate airport design criteria to the operational and physical characteristics of the ***design aircraft*** intended to operate at the airport (i.e. the most critical aircraft type currently using, or projected to use, an airport, with a minimum of 500 operations per year). ARC can either be one aircraft or a group of aircraft. The first component of the ARC is a capital letter (A, B, C, D, or E with "A" being the lowest, and "E" being the highest), which refers to the aircraft approach speed in its landing configuration. The second component, which is depicted by a Roman numeral (I, II, III, IV, V, VI, with "I" being the lowest and "VI" being the highest), refers to aircraft wingspan. Together, the two components relate aircraft operational and physical characteristics to the required design criteria of various airport components, such as runway/taxiway widths, runway to taxiway separation standards, and obstacle clearance items. Under this methodology, safety margins are provided in the physical design of airport facilities.

Airport Surveillance Radar (ASR) – Approach control radar used by air traffic controllers to detect and display an aircraft's position in the airport terminal area. ASR provides range (distance) and ***azimuth*** (direction) information with regard to arriving or departing aircraft.

Air Traffic Service (ATS) Routes – "ATS route," a generic term, includes "VOR Federal airways," "colored Federal airways," "alternate airways," "jet routes," "Military Training Routes," "named routes," and "RNAV routes." The term "ATS route" serves as an overall title for listing the types of routes that comprise the United States route structure.

Airway – A corridor of ***controlled airspace*** whose centerline is established by radio ***navigational aids***. Low altitude airways (between 3,000 and 18,000 feet **Mean Sea Level**) are identified by number with the letter V as a prefix. High altitude airways (above 18,000 feet *Mean Sea Level*) are known as Jet airways and are identified by number with the letter J as a prefix.

Ambient Noise – The total sum of noise from all sources in a given place and time. This is also known as ***Existing Ambient Noise.*** *See* also ***Natural Ambient Noise***.

Approach Light Systems (ALS) – One of various lighting aids that may be installed on an airport. The ALS is a series of lights that provide visual guidance to landing aircraft by radiating light beams in a directional pattern, to assist the pilot when aligning aircraft with the extended runway centerline on ***final approach***.

Attenuation – Acoustical phenomenon whereby ***sound*** energy is reduced between the noise source and the receiver. This energy loss can be attributed to atmospheric conditions, terrain, vegetation, other natural features, and man-made features (e.g., sound insulation).

A-Weighted Sound (dBA) – A system for measuring ***sound*** energy that is designed to represent the response of the human ear to sound. Energy at frequencies more readily detected by the human ear is more heavily weighted in the measurement, while frequencies less well detected are assigned lower weights. A-weighted *sound* measurements are commonly used in studies where the human response to *sound* is the object of the analysis.

Base Flight Segment – A flight path at right angles to the landing runway off its approach end. The base segment normally extends from the downwind segment to the intersection of the extended runway centerline.

Base Leg – A flight path at right angles to the approach of a runway end. It usually extends from the downwind leg to the intersection of the extended runway centerline.

Baseline Condition – The existing condition or conditions prior to future development, which serve as a foundation for analysis.

Building Restriction Line (BRL) – A line drawn on an ***airport layout plan*** that distinguishes between areas that are suitable for buildings and areas that are unsuitable. Typically, a 35-foot building height is used to ensure that all the surfaces in 14 CFR Part 77 are clear.

California Environmental Quality Act (CEQA) – California law requiring the disclosure of environmental effects of proposed projects before discretionary approval can be issued. California law requiring the disclosure of environmental effects of proposed projects before discretionary approval can be issued. CEQA is codified at Public Resources Code Section 21000 et seq.

Capacity – The FAA defines "capacity" as the "throughput rate" of an airport, i.e., the maximum number of aircraft operations that can take place in an hour.

Community Noise Equivalent Level (CNEL) – The CNEL metric is a single value of sound level for 24 hour period, which includes all of the time-varying sound energy within the period. To represent the greater annoyance caused by a noise event during the evening hours, the CNEL metric includes an added 5 dB weighting for evening noise events occurring between 7:00 P.M. and 10:00 P.M. Similarly, the CNEL metric also incorporates a 10 dB nighttime (10:00 P.M. and 7:00 A.M.) penalty to represent the greater annoyance caused by a noise event at night.

Commuter Aircraft – Generally, aircraft of designated size or seating capacity (usually nine or fewer seats) that support scheduled air transportation services for compensation or hire in air commerce, with a frequency of at least five round trip operations per week on at least one route according to a published flight schedule. Commuter aircraft operate pursuant to a ***Federal Aviation Administration*** air carrier certificate issued under 14 CFR Parts 119 and 135 of the ***Federal Aviation Regulations***. (*See* 14 CFR § 119.3, *Definitions*.) ***Regional Jets*** (RJs) are not "commuters," because they are large transport category aircraft and fall within the *Federal Aviation Administration's* ***air carrier aircraf****t* category.

Contour – *See* ***Noise Contour***.

Controlled Airspace – An airspace of defined dimensions within which ***air traffic control*** service is provided to flights operating under both ***Instrument Flight Rules*** and ***Visual Flight Rules*** in accordance with the airspace classification. Controlled airspace designated as Class *A*, Class *B,* Class *C*, Class *D*, and Class *E*, generally according to altitude above the surface, distance from a primary airport, and volume of aircraft operations. Controlled airspace is also that airspace within which all aircraft operators are subject to certain pilot qualifications, operating rules, and equipment requirements (for specific operating requirements, *see* 14 CFR Part 91).

Crosswind Leg – A flight path at right angles to the approach runway end off of the upwind end.

Day-Night Average Sound Level (DNL) - A noise measure used to describe the average ***sound*** level over a 24-hour period, typically an average day over the course of a year. In computing DNL, an extra weight of ten ***decibels*** is assigned to noise occurring between the hours of 10:00 p.m. and 7:00 a.m. to account for increased annoyance when ambient noise levels are lower and people are trying to sleep. DNL may be determined for individual locations or expressed in noise contours.

dBA - ***See A-weighted Sound Level***

Decibel (dB) - ***Sound*** is energy and is measured by its pressure. Because of the enormous range of *sound* pressures to which the human ear is sensitive, the raw sound pressure measurement is converted to the ***decibel*** scale for purposes of description and analysis. The *decibel* scale is logarithmic. A ten-*decibel* increase in *sound* is perceived as a doubling of sound (or twice as loud) by the human ear.

Declared Distances – The distance the airport owner declares available for the airplane's takeoff run, takeoff distance, accelerate-stop distance, and landing distance requirements.

Departure Fix – A departure fix, or so-called departure gate, is a section of airspace used to separate departing from arriving aircraft. This fix determines the initial flight path and direction of the aircraft.

Design Aircraft - The most critical aircraft type currently using, or projected to use, an airport, with a minimum of 500 operations per year. It can either be one aircraft or a group of aircraft. *See* also ***Airport Reference Code***.

Detailed Study Area - One of the areas identified for detailed environmental investigation as part of this ***Environmental Impact Statement***. This *study area* is smaller in scale than the ***General Study Area*** to accommodate the more detailed analyses. (*See* ***General Study Area.*****)**

Displaced Threshold - A threshold that is located at a point on the runway other than the designated beginning of the runway. The portion of pavement behind a displaced threshold may be available for takeoffs in both directions and landings from the opposite direction.

Distance Measuring Equipment (DME) - A flight instrument that measures the line-of-sight distance of an aircraft from a navigational radio station in ***nautical miles.***

Downwind Approach/Arrival – A flight path parallel to the landing runway in the direction opposite to landing.

Easement - The legal right of one party to use part of the rights of a piece of real estate belonging to another party. This may include, but is not limited to, the rite of passage over, on or below the property; certain air rights above the property, including view rights; and the rights to any specified form of development or activity.

Engine Run-ups – A routine procedure for testing aircraft systems by running one or more engines at a high power setting. Engine run-ups are normally conducted by airline maintenance personnel checking an engine or other on board systems following maintenance.

Enplanements - The number of revenue passengers boarding an aircraft at an airport.

EnRoute Air Traffic Control System - Unlike ***airport traffic control tower*** or terminal radar approach control service, *Air Route Traffic Control Centers* provide enroute service*,* generally for aircraft on ***Instrument Flight Rules*** flight plans, when these aircraft are operating between departure and destination airports at designated higher altitudes. When equipment, capabilities, and controller workload permit, certain advisory/assistance services may be provided to ***Visual Flight Rules*** aircraft. Enroute airspace is that airspace not delegated to approach control.

Environmental Impact Report (EIR) – An environmental impact report is an informational document which, when its preparation is required, shall be considered by every public agency prior to its approval or disapproval of a project. The purpose of an environmental impact report is to provide public agencies and the public in general with detailed information about the effect which a proposed project is likely to have on the environment; to list ways in which the significant effects of such a project might be minimized; and to indicate alternatives to such a project.

Environmental Impact Statement (EIS) – As stated in CEQ regulation 40 CFR § 1508.11, a detailed written statement that complies with NEPA section 102 (42 USC § 4332) by including in every report on proposals for major Federal actions significantly affecting the quality of the human environment, a detailed statement on (i) environmental impact of the proposed action, (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented, (iii) alternatives to the proposal, (iv) relationship between local short-term uses of the environment and maintenance and enhancement of long-term productivity, and (v) any irreversible and irretrievable commitment of resources involved in the proposed action, should it be implemented.

Equivalent Sound Level (Leq) – The ***A-weighted*** energy average ***sound*** level experienced over a given period of time. The metric is expressed as ten times the log of the total noise energy divided by the number of seconds during the period under consideration.

Federal Aviation Administration (FAA) – The FAA is the Federal agency responsible for insuring the safe and efficient use of the nation's airspace, for fostering civil aeronautics and air commerce, and for supporting the requirements of national defense. The activities required to carry out these responsibilities include: safety regulations, airspace management and the establishment, operation and maintenance of a system of ***air traffic control*** and navigation facilities; research and development in support of the fostering of a national system of airports, promulgation of standards and specifications for civil airports, and administration of Federal grants-in-aid for developing public airports; various joint and cooperative activities with the Department of Defense, and technical assistance (under State Department auspices) to other countries.

Federal Aviation Regulations (FAR) – The body of Federal regulations enacted by the U.S. Secretary of Transportation, under the statutory authority of the Federal Aviation Act and published in Title 14 of the Code of Federal Regulations (CFR).

Final Approach – A flight path in the direction of landing that follows the extended runway centerline. It usually extends from the ***base leg*** to the runway.

Fixed-Base Operator (FBO) – A business located on the airport that provides services such as hangar space, fuel, flight training, repair, and maintenance to airport users.

Fleet Mix – The mix or differing types of aircraft operating in a particular airport environment.

Flight Track Utilization – The use of established routes for arrival and departure by aircraft to and from the runways at the airport.

General Aviation Aircraft – Generally, those U.S. registered civil aircraft which operate for private and noncommercial purposes and whose operations are not governed by 14 CFR Parts 119, 121, 125, or 135 of the ***Federal Aviation Regulations***. General aviation aircraft range from small single-engine propeller aircraft to large ***turbojet*** private aircraft.

General Study Area (GSA) – One of the areas identified for environmental investigation as part of this ***EIS***. This study area is larger in scale than the ***Detailed Study Area.*** (*See* ***Detailed Study Area.***)

Geographic Information Systems (GIS) – An information system that is designed for storing, integrating, manipulating, analyzing, and displaying data referenced by spatial or geographic coordinates.

Glide Slope (GS) – Provides vertical guidance for aircraft during approach and landing. The glide slope consists of the following:

> Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ***Instrument Landing System***, or visual ground aids, such as ***Visual Approach Slope Indicator***, which provide vertical guidance for ***visual flight rules*** approach or for the visual portion of an ***instrument approach*** and landing.

GPS – **Global Positioning System** equipment onboard an aircraft takes advantage of various radio navigation and/or *Global Positioning System* routes to guide the aircraft. A system of satellites used as reference points to enable navigators equipped with GPS receivers to determine their latitude, longitude, and altitude.

Grid Analysis - A type of aircraft noise analysis that evaluates the noise levels at individual points rather than through generation of ***noise contours***.

Ground Effect - Noise ***attenuation*** attributed to absorption or reflection of noise by man-made or natural features on the ground surface.

Hub - An airport that services airlines that have ***hubbing*** operations.

Hubbing - A method of airline scheduling that times the arrival and departure of several aircraft in a close period of time in order to allow the transfer of passengers between different flights of the same airline in order to reach their ultimate destination. Several airlines may conduct hubbing operations at an airport.

Infill - Urban development occurring on vacant lots in substantially developed areas; may also include the redevelopment of areas to a greater density.

Instrument Approach – A series of predetermined maneuvers for the orderly transfer of an aircraft under ***instrument flight rules*** from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.

Instrument Flight Rules (IFR) – That portion of the ***Federal Aviation Regulations*** (14 CFR Part 91) specifying the procedures to be used by aircraft during flight in ***Instrument Meteorological Conditions.*** These procedures may also be used under visual conditions and provide for ***positive control*** by ***Air Traffic Control***. (*See* also ***Visual Flight Rules)***.

Instrument Landing System (ILS) – An electronic system installed at some airports which helps to guide pilots to runways for landing during periods of limited visibility or adverse weather.

Instrument Meteorological Conditions (IMC) – Weather conditions expressed in terms of visibility, distance from clouds, and cloud ceilings during which all aircraft are required to operate using ***Instrument Flight Rules (IFR)***.

Integrated Noise Model (INM) - A computer model developed, updated and maintained by the ***Federal Aviation Administration*** to predict the noise exposure generated by aircraft ***operations***.

Itinerant Operation - An aircraft flight that ends at an airport different from where the flight began.

Knots - Airspeed measured as the distance in ***nautical miles*** (6,076.1 feet) covered in one hour. (Approximately equal to 1.15 miles per hour.)

Land Use Compatibility - The ability of land uses surrounding the airport to coexist with airport-related activities with minimum conflict.

Landing and Takeoff (LTO) Cycle - The time that an aircraft is in operation at or near an airport. An LTO cycle begins when an aircraft starts its ***final approach*** (arrival) and ends after the aircraft has made its climb-out (departure).

Ldn - *See* ***DNL***. Ldn is used in place of *DNL* in mathematical equations only.

Leq - *See* ***Equivalent Sound Level***.

Local Operation - An aircraft flight that begins and ends at the same airport.

Localizer - The component of an ***Instrument Landing System*** that provides lateral course guidance to the runway.

Loudness - The subjective assessment of the intensity of ***sound***.

Maximum Noise Level (Lmax) - The maximum ***sound*** pressure for a given event adjusted toward the frequency range of human hearing.

Mean Sea Level (MSL) - The average height of the surface of the sea for all stages of the tide; used as a reference for elevations; also called sea level datum.

Military Operations Area - Airspace established to separate or segregate certain non-hazardous military activities from ***Instrument Flight Rules*** traffic and to identify for ***Visual Flight Rules*** traffic where these activities are conducted.

Missed Approach - A maneuver conducted by a pilot when an ***instrument approach*** cannot be completed for landing at an airport. *Instrument approach* procedure charts show the route of flight and altitude that the pilot must follow in this circumstance.

National Airspace System (NAS) - The common network of U.S. airspace, air navigation facilities, equipment, services, airports, or landing areas; aeronautical charts, information, and services; rules, regulations, and procedures; technical information, manpower, and materials, all of which are used in aerial navigation to provide a safe and efficient flying environment.

National Environmental Policy Act of 1969 (NEPA) – The original legislation establishing the environmental review process for proposed Federal actions.

National Pollutant Discharge Elimination System (NPDES) – Federal requirement under the **Clean Water Act (CWA)** that any discharge of a non-point source of pollution into waters of the United States be in conformance with any established water quality management plan developed under the **Clean Water Act**.

Nautical Mile - A measure of distance equal to one minute of arc on the earth's surface (6,076.1 feet or 1,852 meters).

Natural Ambient Noise – *Existing Ambient Noise*, minus man made sounds. *See* ***Ambient Noise*** and ***Existing Ambient Noise***.

NAVAIDs (Navigational Aids) – Any facility used by an aircraft for navigation.

Navigational Fix – A geographical position determined by reference to one or more radio navigational aids.

Noise Abatement – A measure or action that minimizes the amount of impact of noise on the environs of an airport. Noise abatement measures include aircraft operating procedures and use or disuse of certain runways or ***flight tracks***.

Noise Contour – A map representing average annual noise levels summarized by lines connecting points of equal noise exposure.

Nondirectional Beacon (NDB) – A beacon transmitting non-directional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine the bearing to and from the station. When the radio beacon is installed in conjunction with the ***Instrument Landing System*** marker, it is normally called a compass locator.

Nonprecision Approach - A standard ***instrument approach*** procedure providing runway alignment but no ***glide slope*** or descent information.

On-Demand - Generally, U.S. registered civil aircraft of designated size (usually 30 or fewer passenger seats with payload capacity of 7,500 pounds or less) that support on-demand, unscheduled, or infrequently scheduled passenger-carrying or cargo service (including public charters) for compensation or hire, pursuant to a air carrier certificate issued under 14 CFR Parts 119 and 135 of the Federal Aviation Regulations. (*See* 14 CFR § 119.3, Definitions.) This term includes operations formerly classified as air taxi, a term no longer used by the ***Federal Aviation Administration*** but still used by the U.S. Department of Transportation (USDOT).

Precision Approach Path Indicator (PAPI) - Provides visual approach slope guidance to aircraft during an approach. It is similar to a ***Visual Approach Slope Indicator*** but provides a sharper transition between the colored indicator lights.

Precision Approach Procedure - A standard ***instrument approach*** procedure in which an electronic ***glide slope***/glide path is provided (e.g., ***Instrument Landing System*** and ***Precision Approach Radar***).

Precision Approach Radar (PAR) - Navigational equipment located on the ground adjacent to the runway, consisting of one antenna, which scans the vertical plane, and a second antenna, which scans the horizontal plane. The PAR provides the controller with a picture of the descending aircraft in ***azimuth***, distance, and elevation, permitting an accurate determination of the aircraft's alignment relative to the runway centerline and the ***glide slope***.

Profile - The position of the aircraft during an approach or departure in terms of altitude above the runway and distance from the runway end.

Propagation - ***Sound*** propagation is the spreading or radiating of sound energy from the noise source. It usually involves a reduction in sound energy with increased distance from the source. Atmospheric conditions, terrain, natural objects, and manmade objects affect sound propagation.

Public Use Airport - An airport open to public use without prior permission, and without restrictions within the physical capabilities of the facility. It may or may not be publicly-owned.

Record of Decision (ROD) - As stated in CEQ regulation 40 CFR § 1505.2, the ***Federal Aviation Administration's*** findings, explanations, and related justifications after review of a Draft Environmental Assessment or ***Environmental Impact Statement***. The ROD specifies the environmentally preferred alternative.

Regional Jet - A jet aircraft that falls within the air carrier aircraft category because of size and payload. For use in air commerce, the ***regional jet*** must be operated pursuant to an air carrier certificate pursuant to an air carrier certificate issued under 14 CFR Parts 119 and 121 of the ***Federal Aviation Regulations***. (*See* 14 CFR § 119.3, for Domestic, Flag, and Supplemental operations). *Regional jets* are not operated as commuter aircraft pursuant to 14 CFR Part 135. *Regional jets* are typically jet aircraft, with approximately 35 to 90 seats. The next-generation *regional jet*s are expected to seat 100 passengers.

Reliever Airport - An airport which, when certain criteria are met, relieves the aeronautical demand on a busier air carrier airport.

Retrofitted Aircraft - An aircraft originally certified as ***Stage 2*** that has been modified to meet ***Stage 3*** requirements. This includes both modification of engines or the replacement of engines to meet the ***Stage 3*** standard.

Run-up - A routine procedure for testing aircraft systems by running one or more engines at a high power setting. ***Engine run-ups*** are normally conducted by airline maintenance personnel checking an engine or other on board systems following maintenance.

Runway End Identifier Lights (REIL) - Two synchronized flashing lights, one on each side of the ***runway threshold***, which identify the approach end of the runway.

Runway Protection Zone (RPZ) - An area, trapezoidal in shape and centered about the extended runway centerline, designated to enhance the protection of people and property on the ground. It begins 200 feet (60 M) beyond the end of the area usable for takeoff or landing. The RPZ dimensions are functions of the aircraft, type of operation, and visibility minimums. (Formerly known as the clear zone.)

Runway Safety Area (RSA) - A defined surface surrounding the runway prepared or suitable for reducing the risk or damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

Runway Threshold - The beginning of that portion of the runway usable for landing.

Scoping - Scoping is an early and open process for determining the scope or range of issues to be addressed in the ***Environmental Impact Statement*** and identifying the significant issues related to a proposed action. Issues important to the public and local, state, and Federal agencies are solicited through direct mailing, public notices, or meetings. Scoping is generally conducted before development of the ***Environmental Impact Statement*** scope of work.

Single event - One noise event. For many kinds of analysis, the ***sound*** from single events is expressed using the ***Sound Exposure Level*** metric.

Slant-range distance - The distance along a straight line between an aircraft and a point on the ground.

Sound - Sound is the result of vibration in the air. The vibration produces alternating bands of relatively dense and sparse particles of air, spreading outward from the source in the same way as ripples do on water after a stone is thrown into it. The result of the movement is fluctuation in the normal atmospheric pressure or sound waves.

Sound Exposure Level (SEL) - A standardized measure of a ***single (sound) event***, expressed in ***A-weighted decibels***, that takes into account all sound above a specified threshold set at least ten ***decibels*** below the maximum level. All sound energy in the event is integrated over one second.

Special Use Airspace - Airspace of defined dimensions identified by an area on the earth's surface wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft ***operations***, which are not part of those activities.

Stage 2 Aircraft - Aircraft that meet the noise levels prescribed by ***Federal Aviation Regulations*** 14 CFR Part 36, which are less stringent than those established for the quieter ***Stage 3*** designation. The Airport Noise and Capacity Act required the phase-out of all Stage 2 aircraft over 75,000 pounds by December 31, 1999, with the potential for case-by-case exceptions through the year 2003.

Stage 3 Aircraft - Aircraft that meet the most stringent noise levels set in ***Federal Aviation Regulations*** 14 CFR Part 36.

Standard Instrument Departure Procedure (SID) - A planned ***Instrument Flight Rules air traffic control*** departure procedure published for pilot use in graphic and textual form. SIDs provide transition from the terminal to the en route ***air traffic control*** structure.

Statute Mile - A measure of distance equal to 5,280 feet.

Terminal Radar Approach Control (TRACON) - A ***Federal Aviation Administration Air Traffic Control*** Facility which uses radar and two-way communication to provide separation of air traffic within a specified geographic area in the vicinity of one or more airports.

Terminal Radar Service Area (TRSA) - Airspace surrounding certain airports where ***Air Traffic Control*** provides radar ***vectoring,*** sequencing, and separation on a full-time basis for all ***Instrument Flight Rules*** and participating ***Visual Flight Rules*** aircraft.

Time Above (TA) - The amount of time that ***sound*** exceeds a given ***decibel*** level during a 24-hour period (e.g., time in minutes that the sound level is above 75 **decibels**).

Thrust Settings – Settings on an aircraft that control the power applied to the engines.

Traffic Pattern – The traffic flow prescribed for aircraft landing at, taxiing on, or taking off from an airport. The components of a typical traffic pattern are ***upwind leg***, ***crosswind leg***, ***downwind leg***, ***base leg***, and ***final approach***.

Turbojet - An aircraft powered by a jet turbine engine. The term is customarily used in ***air traffic control*** for all aircraft, without propellers, that are powered by variants of jet engines, including turbofans.

Turboprop - Aircraft of this type are typically used by airlines on short routes between two relatively close locations.

Upwind Leg - A flight path parallel to the approach runway in the direction of approach.

Vector - Compass heading instructions issued by ***Air Traffic Control*** in providing navigational guidance by radar.

Very High Frequency Omnidirectional Range (VOR) Station - A ground-based radio navigation aid transmitting signals in all directions. A VOR provides ***azimuth*** guidance to pilots by reception of electronic signals.

Very High Frequency Omnidirectional Range Station with Tactical Air Navigation (VORTAC) - A navigational aid providing ***VOR azimuth*** and ***Tactical Air Navigation distance measuring equipment*** at one site.

Visual Approach - An approach conducted on an ***Instrument Flight Rules*** flight plan, which authorizes the pilot to proceed visually and clear of clouds to the airport.

Visual Approach Slope Indicator (VASI) - A visual aid for final approach to the ***runway threshold***, consisting of two wing bars of lights on either side of the runway. Each bar produces a split beam of light - the upper segment is white, the lower is red.

Visual Flight Rules (VFR) - Rules and procedures specified in ***Federal Aviation Regulations*** 14 CFR Part 91 for aircraft operations under visual conditions. Aircraft operations under VFR are not generally under ***positive control*** by ***Air Traffic Control***. The term VFR is also used in the U.S. to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate a type of flight plan.

Visual Meteorological Conditions (VMC) - Weather conditions expressed in terms of visibility, distance from cloud, and cloud ceiling equal to or greater than those specified in ***Federal Aviation Regulations*** 14 CFR Part 91.155 for aircraft operations under ***Visual Flight Rules***.

Yearly Day-Night Average Sound Level - *see* ***DNL***.

SUMMARY

S.1 INTRODUCTION

This document is the Final Environmental Impact Statement (Final EIS), prepared in support of the federal actions related to a proposed runway and parallel taxiway extension at Gnoss Field Airport (DVO or Airport), a general aviation airport located adjacent to the City of Novato in unincorporated Marin County, California. The Final EIS has been prepared pursuant to the National Environmental Policy Act of 1969 (NEPA) and its implementing regulations found at Title 40, Code of Federal Regulations (CFR) §§ 1500-1508. Marin County has prepared an Environmental Impact Report (EIR), to meet the California Environmental Quality Act of 1970 requirements to analyze and disclose the potential environmental impacts resulting from the proposed runway extension. The FAA and Marin County circulated the Draft EIS and Draft EIR together so the public could comment on both documents at the same time. The FAA Final EIS is Volume 1. Marin County has completed and certified the Final EIR, which was circulated with the Draft EIS as Volume 2. The Technical Appendices, Public Comments, and FAA Responses to Comments are in Volume 3.

A summary of the potential impacts of all alternatives assessed in this EIS is presented in **Table ES-1** (located at the end of this section). The information contained in this EIS will be taken into consideration by the FAA in determining the agency's decision regarding the Proposed Project.

This EIS includes Chapters One through Seven and Appendices A through Q.

Chapter One – **Background** – *describes the history of the project and summarizes planning and environmental studies conducted by the Airport Sponsor and the FAA.*

Chapter Two – **Purpose and Need** – *describes the problem to be addressed, how the alternatives would resolve the problem, the underlying purpose and need for the action, the desires or preferences of the Airport Sponsor, and the parameters used to define a reasonable range of alternatives.*

Chapter Three – **Alternatives** – *describes the range of alternatives reviewed to address the previously identified purpose and need, the process used to screen and evaluate reasonable alternatives, and the alternatives carried forward for detailed environmental evaluation.*

Chapter Four – **Affected Environment** – *describes the existing conditions within the Study Area.*

Chapter Five – **Environmental Consequences** – *describes the analytical processes used and the potential environmental impacts that would result from implementation of the proposed project and alternatives to the proposed project evaluated in detail.*

Chapter Six – **Cumulative Impacts** – *describes the potential combined impacts of the proposed alternatives at DVO when added to the impacts of past, present, and reasonably foreseeable future projects in the vicinity of DVO.*

Chapter Seven – **List of Preparers, List of Agencies, and Persons to Whom Copies are Sent** – *lists the people who contributed to the preparation of this EIS and the agency and public distribution list.*

The following appendices contain detailed information used in the development of the EIS for the subject area noted in the Appendix title:

Appendix A – Agency Scoping and Coordination

Appendix B – Public Involvement

Appendix C – Aviation Activity Forecast

Appendix D – Runway Length Analysis

Appendix E – Noise Methodology

Appendix F – Air Quality

Appendix G – Water Quality

Appendix H – Cultural Resources

Appendix I – Biological Resources

Appendix J – Wetlands

Appendix K – Energy Supply, Natural Resources, and Sustainable Design

Appendix L – Hazardous Materials

Appendix M – Geology, Soils, and Seismicity Resources

Appendix N – Mineral Resources

Appendix O – Land Use Assurance Letter

Appendix P – Comments Received on Draft EIS/EIR

Appendix Q – FAA Response to Comments

S.2 BACKGROUND

S.2.1 SPONSOR'S GOALS AND OBJECTIVES

As the Airport sponsor, Marin County has identified the following goals and objectives for the Airport and this project:

1. To make improvements at DVO that are consistent with the 2007 Marin Countywide Plan, the 1997 Update of the Airport Master Plan, and the 1991 Airport Land Use Plan.
2. To make improvements at DVO that are consistent with FAA Advisory Circular 150/5300-13A *Airport Design,*[1] airport design standards for a B-I (small) Design Group Airport intended to serve aircraft with a wing span of less than 49 feet, maximum certificated takeoff weight of 12,500 pounds or less, and an approach speed of 91 to 121 knots.
3. To extend the length of the existing runway at DVO to allow the existing aircraft, as represented by the critical aircraft[2], to operate efficiently during all weather conditions.

S.2.2 PURPOSE AND NEED

S.2.2.1 Sponsor's Purpose and Need

The Sponsor's purpose and need is to fully accommodate existing aviation activity, as represented by the critical aircraft that regularly uses the Airport under hot weather and other adverse weather conditions.[3] DVO is designated as an Airport Reference Code B-I airport to accommodate aircraft with a wingspan of 49 feet or less, and an approach speed of 91 to 121 knots. (See Appendix D, *Runway Length Analysis*, for details). Prior planning studies and evaluations of the Airport's ability to accommodate existing aircraft include the 1989 Airport Master Plan,[4] the 1997 Update of the Airport Master Plan, and the 2002 Preliminary Design Report[5] for the proposed runway extension.

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1 This EIS was initially prepared using the earlier version of this Advisory Circular. FAA revised the Advisory Circular effective on September 28, 2012. The particular design standards related to the proposed project reviewed in this EIS did not change in the updated version of the Advisory Circular.

2 The critical aircraft for DVO is Cessna Citation 525 (Cessna 525) business jet. See Chapter Two, *Purpose and Need*, and Appendix D, Attachment 1, *Basis for Determination of the Critical Aircraft for DVO*, for details regarding this determination.

3 For the purpose of this EIS, hot weather is defined as the mean daily maximum temperature of the hottest month at the Airport (FAA A/C 150/5325-4B paragraph 506) and adverse weather conditions include wet runways, icy runways, and crosswinds.

4 Marin County, *Airport Master Plan Marin County Airport Gnoss Field*, 1989.

5 Cortright & Seibold, *Preliminary Design Report, Runway Extension, Gnoss Field*, 2002.

S.2.2.2 FAA Purpose and Need

The FAA's statutory mission is to ensure the safe and efficient use of navigable airspace in the U.S. as set forth under 49 United States Code (USC) § 47101 (a)(1). The FAA must ensure that the proposed action does not derogate the safety of aircraft and airport operations at DVO. Moreover, it is the policy of the FAA under 49 USC § 47101(a)(6) that airport development projects provide for the protection and enhancement of natural resources and the quality of the environment of the United States.

S.2.3 SPONSOR'S PROPOSED PROJECT

As the owner and operator of the Airport, Marin County, California is the Sponsor of the proposed project. The Sponsor's Proposed Project is designed to address the needs of the Airport and includes the following elements:

- Extend Runway 13/31 to the northeast by 1,100 feet increasing the total runway length from 3,300 feet to a total length of 4,400 feet while maintaining the 75-foot width of the runway;
- Extend the parallel taxiway to the full length of the runway;
- Extend the existing Runway Safety Area (RSA) along the sides of Runway 13/31 to maintain the existing RSA width of 120 feet centered on the runway centerline;
- Extend RSA to 240 feet long beyond each end of Runway 13/31 to meet current FAA B-I airport design standards;
- Corresponding realignment of drainage channels to drain the extended runway and taxiway;
- Corresponding levee extension to protect the extended runway and taxiway from flooding;
- Install and/or relocate the navigational aids that pilots use to land at the Airport to reflect the extended runway; and
- Acquire 0.1 acre of undeveloped land south of the Airport from the adjoining private landowner to provide a 240 foot long RSA on the south end of Runway 13/31.

Marin County intends to keep the Airport open for business during construction of the proposed runway extension and the other supporting elements listed above.

S.2.4 FEDERAL ACTIONS

Several Federal actions are directly or indirectly proposed to occur. Implementation of the Sponsor's Proposed Project or other build alternatives would require several Federal actions and approvals. These include:

- Unconditional approval of the Airport Layout Plan (ALP) to depict the land acquisition, proposed runway extensions and parallel taxiway extension pursuant to 49 United States Code (USC) §§ 40103(b) and 47107(a)(16);

- Air traffic control and airspace management procedures designed to affect the safe and efficient movement of air traffic to and from the proposed runway development. Such actions would include, but are not limited to, the establishment or modification of flight procedures and the installation and/or relocation of Navigational Aids (NAVAIDs) associated with the proposed runway and taxiway extension.
- Determination of eligibility for federal assistance for the proposed projects under the Federal grant-in-aid program authorized by the Airport and Airway Improvement Act of 1982, as amended (49 USC § 47101 et seq.);
- Determinations under 49 USC §§ 47106 and 47107 relating to the eligibility of the Proposed Action for federal funding under the Airport Improvement Program (AIP) to assist with construction of potentially eligible development items shown on the ALP;
- Determination of the effects of the proposed extension of the runway and parallel taxiway and the corresponding increase in size of the associated runway safety area upon the safe and efficient use of navigable airspace pursuant to Title 14 CFR Part 77, *Objects Affecting Navigable Airspace*. The FAA must determine if the proposed improvements, as proposed by Marin County are consistent with the existing airspace utilization and procedures;
- Determination under 49 USC § 44502(b) that the airport development is reasonably necessary for use in air commerce or in the interests of national defense;
- Approval of further processing of an application for federal assistance for near-term eligible projects using federal funds from the Airport Improvement Program, as shown on the ALP; and
- Approval of a Construction Safety and Phasing Plan to maintain aviation and airfield safety during construction pursuant to FAA Advisory Circular 150/5370-2F *Operational Safety on Airports During Construction*.

The proposed improvements under consideration in this EIS, and described as Alternatives B and D in Chapter Three, *Alternatives* are designed to allow the Airport to accommodate existing aviation traffic and passenger demand.

S.2.5 ALTERNATIVES

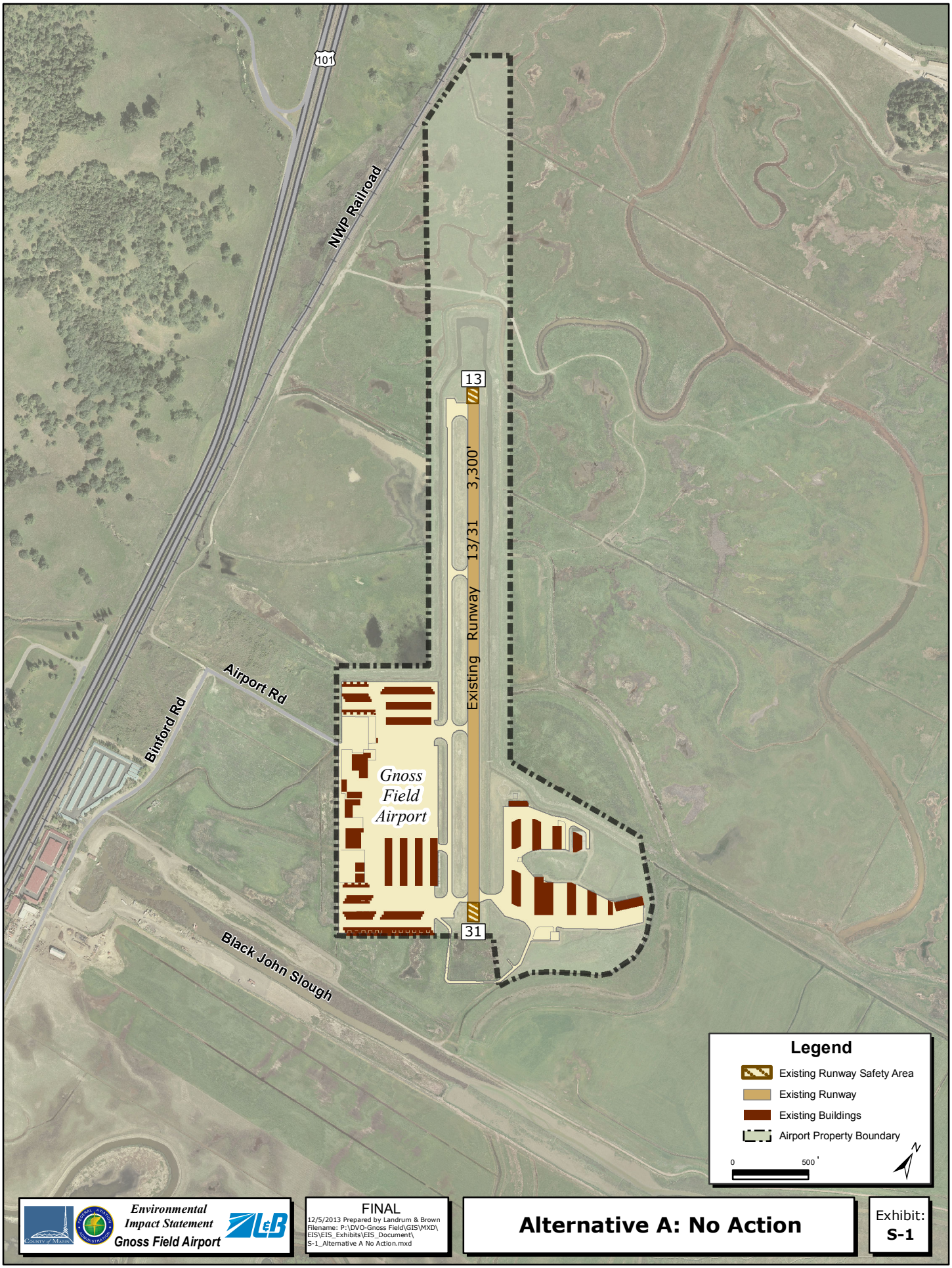
The analysis of EIS alternatives was an independent examination by the FAA using a two-step screening process. The first step in the screening process was to identify if an alternative could meet the purpose for the Sponsor's Proposed Project as described in detail in Chapter Two, *Purpose and Need.* Alternatives that did not meet the purpose for the project were excluded from further review. The second step was to further evaluate the remaining alternatives for additional considerations, including significant environmental, operational, cost considerations and reasonable, possible, and prudent alternative considerations. The EIS

considered both on and off-airport alternatives to the Sponsor's Proposed Project. Off-airport alternatives were considered in Section 3.3 of the EIS, but none were found that met the purpose and need for the proposed project.

On-airport alternatives to the Sponsor's Proposed Project were evaluated in Section 3.4. The No Action Alternative was included in the evaluation of potential environmental consequences in this EIS, as required by 40 CFR § 1502.14(d). With a No Action Alternative, the airfield layout would remain as it is today, without an extension to the existing runway and no parallel taxiway extension and levee relocations. Although not always reasonable, feasible, prudent, or practicable, the No Action Alternative is a potential alternative under NEPA and provides a basis of comparison for the assessment of future conditions and environmental impacts. Alternatives that meet the purpose and need and were determined to be reasonable, possible, and prudent were also carried forward for further evaluation in the EIS. The following alternatives were carried forward for further evaluation in the EIS:

- Alternative A: No Action – This alternative includes no changes to the Airport. See **Exhibit S-1, *Alternative A: No Action***.
- Alternative B: Sponsor's Proposed Project, Extend runway to the northwest by 1,100 feet. See **Exhibit S-2, *Alternative B*: *Sponsor's Proposed Project - Extend Runway to the Northwest by 1,100 Feet.***
- Alternative D: Extend runway to the southeast by 240 feet and to the northwest by 860 feet. See **Exhibit S-3, Alternative D: *Extend Runway to the Southeast by 240 Feet and to the Northwest by 860 Feet***.

An additional on-site alternative, Alternative C: Extend Runway to the southeast by 1,100 feet, was considered. Alternative C would result in greater impacts to wetlands and waterways than Alternative B or Alternative D, and would require filling a portion of Black John Slough. As the same project purpose can be accomplished by implementation of Alternative B or Alternative D, and the Clean Water Act, Section 404, (b)(1) guidelines only allow the U. S. Army Corps of Engineers to issue a Clean Water Act, Section 404 permit for the least environmentally damaging practicable alternative, it is not likely that the USACOE would issue Marin County a Clean Water Act, Section 404 permit to construct Alternative C, when Alternatives B and D have been identified as practicable. Therefore, Alternative C was not carried forward for detailed analysis.



Environmental Impact Statement
Gnoss Field Airport

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12/5/2013 Prepared by Landrum & Brown
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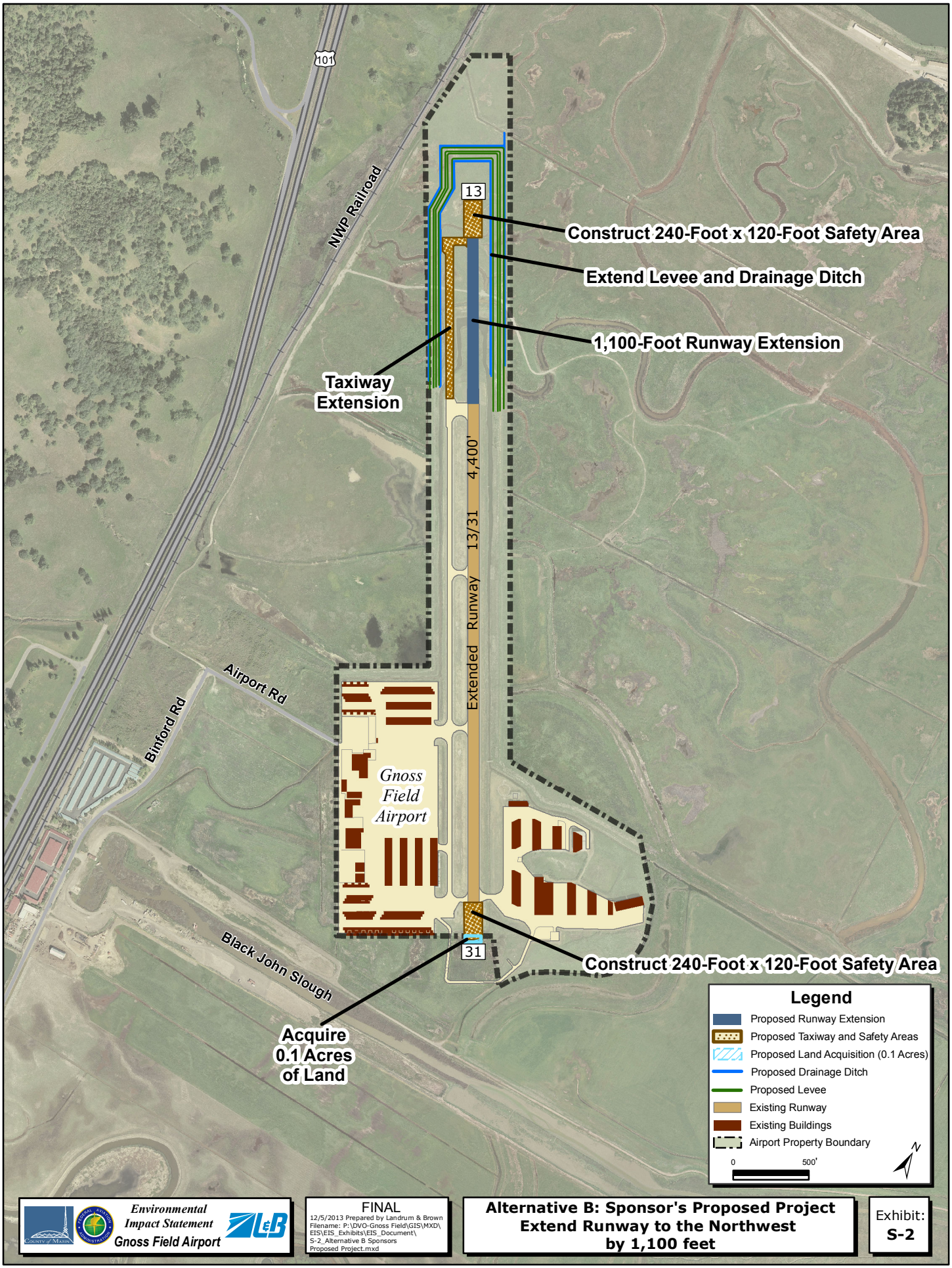
Alternative A: No Action

Exhibit: **S-1**



Environmental Impact Statement
Gnoss Field Airport

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12/5/2013 Prepared by Landrum & Brown
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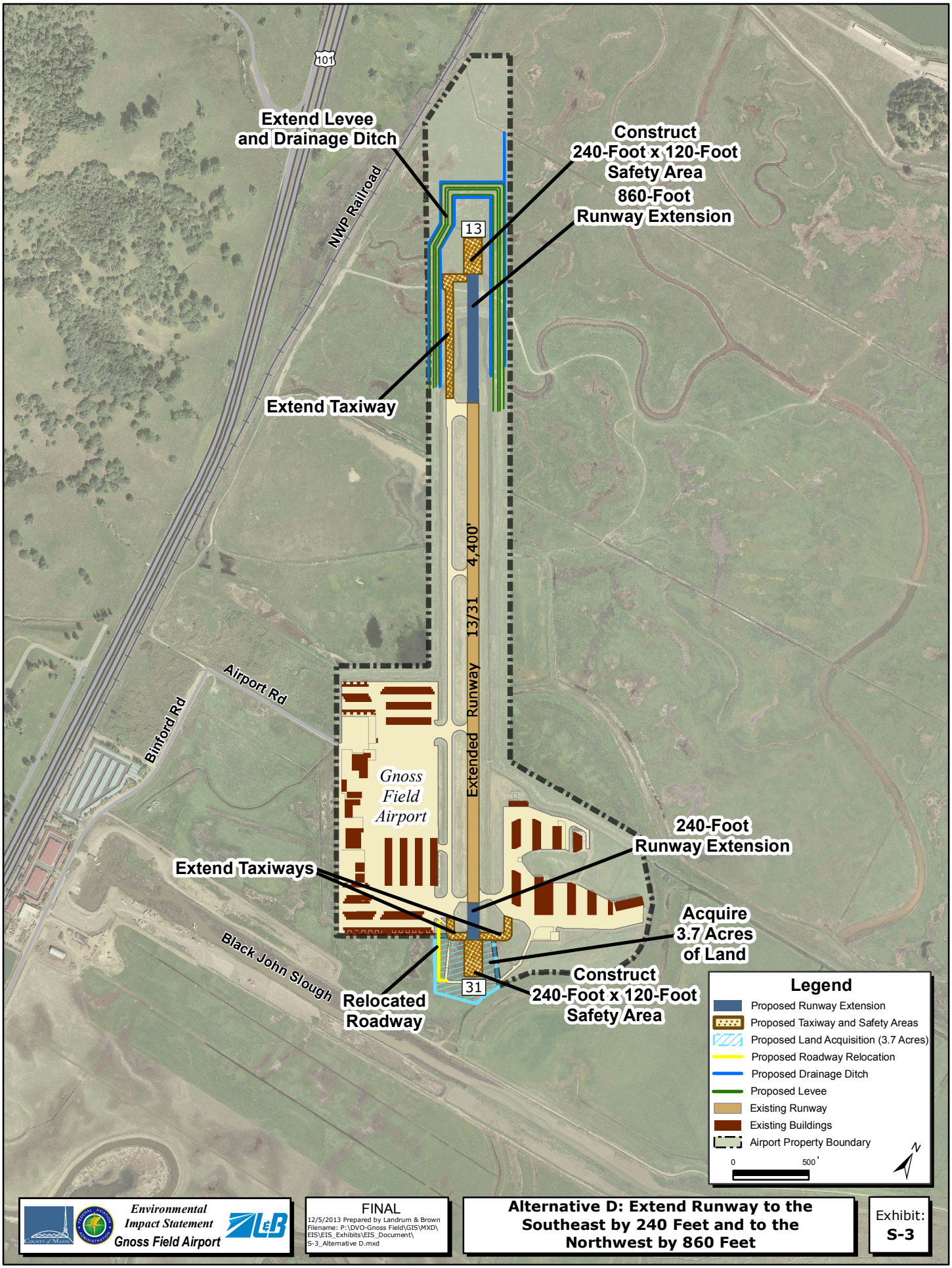
Alternative B: Sponsor's Proposed Project
Extend Runway to the Northwest by 1,100 feet

Exhibit: **S-2**


Extend Levee and Drainage Ditch
Construct 240-Foot x 120-Foot Safety Area
860-Foot Runway Extension
NWP Railroad
101
13
Extend Taxiway
4,400'
13/31
Runway
Extended
Airport Rd
Binford Rd
Gnoss Field Airport
240-Foot Runway Extension
Extend Taxiways
Acquire 3.7 Acres of Land
Black John Slough
31
Relocated Roadway
Construct 240-Foot x 120-Foot Safety Area
Legend
Proposed Runway Extension
Proposed Taxiway and Safety Areas
Proposed Land Acquisition (3.7 Acres)
Proposed Roadway Relocation
Proposed Drainage Ditch
Proposed Levee
Existing Runway
Existing Buildings
Airport Property Boundary
0
500'
Environmental Impact Statement
Gnoss Field Airport
FINAL
12/5/2013 Prepared by Landrum & Brown
Filename: P:\DVO-Gnoss Field\GIS\MXD\EIS\EIS_Exhibits\EIS_Document\S-3_Alternative D.mxd
Alternative D: Extend Runway to the Southeast by 240 Feet and to the Northwest by 860 Feet
Exhibit:
S-3

S.3 ENVIRONMENTAL CONSEQUENCES

The impacts resulting from implementation of the Sponsor's Proposed Project (Alternative B), Alternative D, and the No Action Alternative are disclosed in Chapter Five, Environmental Consequences, of this EIS. The impacts of each alternative are disclosed for project year 2018. The FAA uses 2018 as a basis for analysis because it is the projected implementation year of the proposed runway extension. In addition, specific Airport activity levels and their associated air quality and noise impacts are evaluated for a condition five years beyond the opening year (2023).

The environmental consequences section forms the scientific and analytical basis for comparing the impacts of the development alternatives. It includes considerations of direct and indirect effects and their significance and possible conflicts between the alternatives and the objectives of Federal, regional, state, and local land use plans, policies and controls for the area concerned.

Based on the guidance provided by FAA Order 5050.4B, *National Environmental Policy Act Implementing Instructions for Airport Actions* and FAA Order 1050.1E, Change 1, *Environmental Impacts: Policy and Procedures*, the environmental impacts of the alternatives have been evaluated within 18 general impact categories and cumulative impacts. A summary of the potential impacts resulting from implementation of the alternatives is also presented in **Table S-1** located at the end of this section.

S.4 MITIGATION

This EIS identified potential impacts associated with implementation of each of the development alternatives. The EIS includes mitigation possibilities (those actions considered to avoid, minimize, rectify, reduce, or eliminate potential impacts resulting from implementation of any of the runway extension alternatives) for environmental resources where potential impacts were identified. Mitigation and other conditions established in this EIS, or during its review, are subsequently committed to by the FAA in its Record of Decision. These mitigation measures would be implemented by the Airport Sponsor. The FAA would ensure implementation of such mitigation measures through the use of special conditions on grants, Grant-in-aid Agreements, contract specifications, other review or implementation procedures and other appropriate follow-up actions in accordance with Title 40 CFR § 1505.3. A summary of the mitigation possibilities associated with potential impacts is presented in **Table S-1** located at the end of this section.

S.5 IDENTIFICATION OF FAA'S PREFERRED ALTERNATIVE

Council on Environmental Quality (CEQ) guidance [40 CFR § 1502.14(e)] requires all Federal agencies to identify a preferred alternative. According to FAA Order 5050.4B Paragraph 1007e.(7), the approving FAA official selects the preferred alternative after reviewing each alternative's ability to fulfill the agency's mission while considering their economic and environmental impacts, and technical factors. As discussed in Chapter Two, Purpose and Need, the two development alternatives evaluated in detail in the EIS would meet the project purpose and need.

FAA's Preferred Alternative: In selecting its Preferred Alternative, the FAA carefully considered each of the alternatives. See Section S.2.4, *Alternatives* and Chapter Three, *Alternatives*, to review the full description of each of the alternatives.

- Alternative A (No Action) does not meet the identified purpose and need.
- Alternative B (Sponsor's Proposed Project) meets the identified purpose and need for the project. In addition, Alternative B has the least environmental impacts of the development alternatives.
- Alternative D meets the identified purpose and need for the project. However, there are increased environmental impacts and costs associated with the project as compared to Alternative B (Sponsor's Proposed Project).

Alternative B, extend Runway 13/31 to the north by 1,100 feet, is the FAA's Preferred Alternative. Extending Runway 13/31 to the north by 1,100 feet would meet the Sponsor's purpose and need for the proposed project to accommodate existing aviation activity, as represented by the critical aircraft that regularly uses the Airport under hot weather and other adverse weather conditions, without derogating the safety of aircraft and Airport operations and with fewer adverse environmental impacts than Alternative D.

Table S-1
ENVIRONMENTAL IMPACT SUMMARY MATRIX
Gnoss Field Airport

IMPACT CATEGORY	ALTERNATIVE A – NO ACTION	ALTERNATIVE B	ALTERNATIVE D	POTENTIAL MITIGATION
Noise				
Residential Housing Units or Noise-Sensitive Facilities with 65+ CNEL	None	Not Significant	Not Significant	Not Applicable (N/A)
Compatible Land Use	No Land Use/Zoning Changes; would be consistent with future plans for the land and would be compatible with local land use plans.	Acquisition of 0.1 acres of undeveloped land; implementation would be consistent with future plans for the land and would be compatible with local land use plans.	Acquisition of 3.7 acres of undeveloped land; implementation would be consistent with future plans for the land and would be compatible with local land use plans.	N/A
Socioeconomic, Environmental Justice, & Children's Health				
Socioeconomic Impacts	Would not have a significant impact on socioeconomic resources	Acquisition of 0.1 acres of undeveloped land; Loss of $10.43 in annual tax revenue is Not Significant. Would not have a significant impact on socioeconomic resources.	Acquisition of 3.7 acres of undeveloped land; Loss of $551.10 in annual tax revenue is Not Significant. Would not have a significant impact on socioeconomic resources.	N/A
Environmental Justice	No impact	With implementation of the compensatory mitigation measures identified in this EIS Alternative B would not disproportionately impact any low income or minority populations.	With implementation of the compensatory mitigation measures identified in this EIS Alternative D would not disproportionately impact any low income or minority populations.	N/A
Children's Health and Safety	No impact	Would not result in the release of, nor exposure to, significant levels of harmful agents in the water, air, or soil that would affect children's health or safety.	Would not result in the release of, nor exposure to, significant levels of harmful agents in the water, air, or soil that would affect children's health or safety.	N/A

Table S-1, *Continued*
ENVIRONMENTAL IMPACT SUMMARY MATRIX
Gnoss Field Airport

IMPACT CATEGORY	ALTERNATIVE A – NO ACTION	ALTERNATIVE B	ALTERNATIVE D	POTENTIAL MITIGATION
Secondary (Induced) Impacts				
Impacts to population	Would not result in significant shifts in patterns of population movement or growth inside or outside of the GSA.	Would not result in significant shifts in patterns of population movement or growth inside or outside of the GSA.	Would not result in significant shifts in patterns of population movement or growth inside or outside of the GSA.	N/A
Public Service demands	Would not result in significant impacts to public service demands.	Would not result in significant impacts to public service demands.	Would not result in significant impacts to public service demands	N/A
Business and economic activity	Would not result in significant impacts to business and economic activity.	Additional temporary economic activity during construction. Not anticipated to induce additional growth in the region.	Additional temporary economic activity during construction. Not anticipated to induce additional growth in the region.	N/A
Air Quality	No impact	Not Significant. Impacts Would Not Exceed Federal Standards	Not Significant. Impacts Would Not Exceed Federal Standards	N/A
Water Quality	DVO will continue to operate under its SWPPP and continue to implement BMPs to minimize the potential for pollutants to be discharged to the water bodies adjacent to the Airport. As such, implementation of Alternative A would not result in a significant impact on water quality.	Based on the current BMPs, SWPPP, and permits that are in place, it is not anticipated that Alternative B would exceed water quality standards, create water quality problems that cannot be avoided or mitigated, or result in difficulties in obtaining permits. Therefore, no significant impacts are anticipated with implementation of Alternative B.	Based on the current BMPs, SWPPP, and permits that are in place, it is not anticipated that Alternative D would exceed water quality standards, create water quality problems that cannot be avoided or mitigated, or result in difficulties in obtaining permits. Therefore, no significant impacts are anticipated with implementation of Alternative D.	N/A

Table S-1, *Continued*
ENVIRONMENTAL IMPACT SUMMARY MATRIX
Gnoss Field Airport

IMPACT CATEGORY	ALTERNATIVE A – NO ACTION	ALTERNATIVE B	ALTERNATIVE D	POTENTIAL MITIGATION
DOT Section 4(f) (Recodified as 303c) Resources and Land and Water Conservation Act, Section 6(f) Resources	No impact	Implementation of Alternative B would not result in the physical taking, constructive use, or conversion of any Section 4(f) resource to other purposes, impair the use of any Section 4(f) property, or subject any Section 4(f) property to incompatible noise levels. Therefore, the effect of implementation of Alternative B on Section 4(f) resources would not be significant.	Implementation of Alternative D would not result in the physical taking, constructive use, or conversion of any Section 4(f) resource to other purposes, impair the use of any Section 4(f) property, or subject any Section 4(f) property to incompatible noise levels. Therefore, the effect of implementation of Alternative D on Section 4(f) resources would not be significant.	N/A
Historical, Architectural, Archaeological, & Cultural Resources				
Direct Effects (Physical Impacts)	No direct impact	No direct impact	No direct impact	Even though no mitigation is required, the FAA will require Marin County to have an archeological monitor on-site during initial site excavation to evaluate any unanticipated discovery of unknown cultural resources.
Indirect Effects (Noise Impacts)	No indirect impact	No indirect impact	No indirect impact	N/A
Summary	FAA finds implementation of the No Action Alternative would not affect any properties listed or eligible for listing on the National Register of Historic Places.	FAA finds the proposed undertaking would not affect any properties listed or eligible for listing on the National Register of Historic Places.	FAA finds the proposed undertaking would not affect any properties listed or eligible for listing on the National Register of Historic Places.	N/A

Table S-1, *Continued*
ENVIRONMENTAL IMPACT SUMMARY MATRIX
Gnoss Field Airport

IMPACT CATEGORY	ALTERNATIVE A – NO ACTION	ALTERNATIVE B	ALTERNATIVE D	POTENTIAL MITIGATION
Fish, Wildlife, & Plants	No impact	Removal of approximately 24.47 acres of plant and wildlife habitat suitable for the endangered salt marsh harvest mouse and the endangered California clapper rail including permanent loss of 6.88 acres of high brackish marsh/annual grassland habitat, permanent loss of 1.54 acres of open water ditch/channel habitat, and temporary loss of 16.05 acres of high brackish marsh/annual grassland habitat. The losses of aquatic habitat under Alternative B are considered significant, and will be mitigated as described in detail in Sections 5.9, Fish, Wildlife, and Plants; and 5.10, Wetlands. Impact is considered significant, but mitigatable to a not significant level.	Removal of approximately 28.29 acres of plant and wildlife habitat suitable for the endangered salt marsh harvest mouse and the endangered California clapper rail including permanent loss of 8.24 acres of high brackish marsh/annual grassland habitat, permanent loss of 1.62 acres of open water ditch/channel habitat, and temporary loss of 18.43 acres of high brackish marsh/annual grassland habitat. The losses of aquatic habitat under Alternative D are considered significant, and will be mitigated as described in detail in Sections 5.9, Fish, Wildlife, and Plants; and 5.10, Wetlands. Impact is considered significant, but mitigatable to a not significant level.	Marin County, as the Airport sponsor, would be responsible for developing a mitigation plan acceptable to the USFWS. During ESA Section 7 consultation, the USFWS found the conceptual mitigation options presented were suitable and developed restoration/compensation ratios for the habitat impacts. Based on the ratios, Alternative B would require between 42.9 to 57.3 acres of off-site restoration/compensation and 16.05 acres of on-site restoration. Alternative D would require between 49.9 to 66.5 acres of off-site restoration/compensation and 18.43 acres of on-site restoration.

Table S-1, *Continued*
ENVIRONMENTAL IMPACT SUMMARY MATRIX
Gnoss Field Airport

IMPACT CATEGORY	ALTERNATIVE A – NO ACTION	ALTERNATIVE B	ALTERNATIVE D	POTENTIAL MITIGATION
Wetlands	No impact	Would impact 11.83 acres of wetlands regulated under Section 404 of the CWA, of which 2.66 acres are also regulated under the RHA. Implementation of Alternative B would result in significant impacts to wetlands and aquatic resources unless compensatory mitigation is provided. As described in Section 5.10.6 several options for compensatory mitigation for wetland and aquatic habitat losses associated with the implementation of Alternative B are available. A detailed compensatory mitigation plan would be required to obtain the necessary authorizations to construct Alternative B. With implementation of a mitigation plan to compensate for the losses of wetland and aquatic habitat resulting from the construction of Alternative B, the environmental impact of Alternative B would not be significant.	Would impact 12.73 acres of wetlands regulated under Section 404 of the CWA, of which 2.56 acres are also regulated under the RHA. Implementation of Alternative D would result in significant impacts to wetlands and aquatic resources unless compensatory mitigation is provided. As described in Section 5.10.6 several options for compensatory mitigation for wetland and aquatic habitat losses associated with the implementation of Alternative D are available. A detailed compensatory mitigation plan would be required to obtain the necessary authorizations to construct Alternative D. With implementation of a mitigation plan to compensate for the losses of wetland and aquatic habitat resulting from the construction of Alternative D, the environmental impact of Alternative D would not be significant.	Coordination with the USACOE and local wetland banks is on-going. Marin County, as the Airport sponsor, would be responsible for developing a mitigation plan acceptable to the USACOE. Final mitigation ratios for restoration/compensation will be identified after coordination with USACOE is complete. However, based on Marin County policies and the likelihood that Marin County will choose to coordinate the wetland mitigation requirements identified in the CWA Section 404 permit with the habitat compensation requirements of the USFWS Biological Opinion, wetland mitigation estimates can be made. Alternative B could require an estimated 35.49 acres of restoration/compensation. Alternative D could require 38.19 acres of restoration/compensation.

Table S-1, *Continued*
ENVIRONMENTAL IMPACT SUMMARY MATRIX
Gnoss Field Airport

IMPACT CATEGORY	ALTERNATIVE A – NO ACTION	ALTERNATIVE B	ALTERNATIVE D	POTENTIAL MITIGATION
Floodplains	No impact.	Would enclose approximately 13 additional acres of the approximately 3,875 acre 100-year floodplain behind the Airport levee. Implementation of Alternative B would not result in a significant encroachment on the existing 100-year floodplain. Therefore implementation of Alternative B would not result in a significant impact on the 100-year floodplain.	Would enclose approximately 15 additional acres of the approximately 3,875 acre 100-year floodplain behind the Airport levee. Implementation of Alternative D would not result in a significant encroachment on the existing 100-year floodplain. Therefore implementation of Alternative D would not result in a significant impact on the 100-year floodplain.	N/A
Coastal Resources	No impact	No permit for this project is required from the Bay Conservation and Development Commission because DVO is located outside of the coastal zone. Construction of Alternative B would not impact the coastal zone. Therefore, construction of Alternative B on Airport property would not have a significant impact on coastal resources.	No permit for this project is required from the Bay Conservation and Development Commission because DVO is located outside of the coastal zone. Construction of Alternative D would not impact the coastal zone. Therefore, construction of Alternative D on Airport property would not have a significant impact on coastal resources.	N/A
Wild & Scenic Rivers	No impact	No impact	No impact	N/A
Farmlands	No impact	No impact	No impact	N/A

Table S-1, *Continued*
ENVIRONMENTAL IMPACT SUMMARY MATRIX
Gnoss Field Airport

IMPACT CATEGORY	ALTERNATIVE A – NO ACTION	ALTERNATIVE B	ALTERNATIVE D	POTENTIAL MITIGATION
Energy Supply & Natural Resources		Alternative B would not result in a substantial increase in demand for energy, natural resources, fuel, or rare consumable natural resources, and would allow the critical aircraft operating at DVO to increase its efficiency and sustainability by being able to take off at maximum gross take-off weight under all weather conditions. Therefore, Alternative B would not have a significant impact on Energy Supply, Natural Resources, or be inconsistent with Sustainable Design.	Alternative D will not result in a substantial increase in demand for energy, natural resources, fuel, or rare consumable natural resources, and would allow the critical aircraft operating at DVO to increase its efficiency and sustainability by being able to take off at maximum gross take-off weight under all weather conditions. Therefore, Alternative D would not have a significant impact on Energy Supply, Natural Resources, or be inconsistent with Sustainable Design.	
Natural Resources	No impact			N/A
Energy	No impact			N/A
Light Emissions & Visual Impact	No impact	Alternative B would not result in significant visual or aesthetic impacts.	Alternative D would not result in significant visual or aesthetic impacts.	N/A
Hazardous Materials	No impact	Not Significant	Not Significant	N/A
Construction Impacts	No impact	Construction impacts associated with the implementation of Alternative B would not be significant.	Construction impacts associated with the implementation of Alternative D would not be significant.	N/A
Cumulative Impacts	No impact	Not Significant	Not Significant	N/A

Source: Landrum & Brown, 2011

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APPROVAL

After careful and thorough consideration of the facts contained herein, and following consideration of the views of those Federal agencies having jurisdiction by law or special expertise on environmental impacts described, the undersigned finds that the proposed Federal action is consistent with existing national environmental policies and objectives as set forth in section 101(a) of the National Environmental Policy Act of 1969.

Approved _____ DATE JUNE 11, 2014

Mark A. McClardy
Manager, Airports Division
Western Pacific Region, AWP 600

Disapproved _____ DATE _____

Mark A. McClardy
Manager, Airports Division
Western Pacific Region, AWP 600

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CHAPTER ONE
BACKGROUND

This document is the Final Environmental Impact Statement (Final EIS), prepared in support of the Federal actions related to proposed runway and parallel taxiway extension at Gnoss Field Airport (DVO or Airport). The Final EIS has been prepared pursuant to the National Environmental Policy Act of 1969 (NEPA) and its implementing regulations found at Title 40, Code of Federal Regulations (CFR) §§ 1500-1508. Marin County has prepared an Environmental Impact Report (EIR), to meet the California Environmental Quality Act of 1970 requirements to analyze and disclose the potential environmental impacts resulting from the proposed runway extension. The Federal Aviation Administration (FAA) EIS is Volume 1. Marin County has completed and certified the EIR, which was circulated with the Draft EIS as Volume 2. The Technical Appendices, Public Comments, and FAA Response to Comments for the FEIS Volume 1 are included in Volume 3. This document was prepared in conjunction with the EIR.

The proposed runway extension would require changes to the Airport Layout Plan, which must be approved by the FAA. This approval constitutes a Federal action requiring NEPA review (see Chapter Two, *Purpose and Need*, Section 2.3 for a full list of Federal actions). The information contained in this EIS will be taken into consideration by the FAA in determining the agency's decision regarding Marin County's Proposed Project.

The purpose of preparing an EIS is to investigate, analyze, and disclose the potential impacts of a proposed action and its reasonable alternatives. This EIS evaluates the potential impacts associated with extending Runway 13/31 and its associated parallel taxiway, to the northwest by 1,100 feet thereby increasing the total runway length from 3,300 feet to a total length of 4,400 feet while maintaining the 75-foot width of the runway. Additionally, in order for the extended runway to become operational, the FAA would need to develop air traffic control and airspace management procedures regarding the safe and efficient movement of air traffic to and from the runway. Such actions could include, but not be limited to the establishment or modification of flight procedures and the installation and/or relocation of navigational aids.

This EIS assesses the foreseeable environmental conditions that would be expected in 2018, provided the Sponsor's Proposed Project is approved and implemented. These are discussed in Chapter Five, *Environmental Consequences* of this document. This timeframe corresponds to the anticipated opening of extended Runway 13/31. In addition, specific Airport activity levels and their associated air quality and noise impacts are evaluated for a condition five years beyond the opening year (2023).[1]

[1] FAA Order 1050.1E, Change 1, *Environmental Impacts: Policies and Procedures,* Appendix A, Section 14, Paragraph 14.4g (2)

This chapter contains the background, history, and description of DVO. Descriptions of the Airport layout, facilities, and services, as well as aviation activity, both actual and forecasted, are also presented so that the reader may understand the operations of the Airport and the context in which the proposed development actions and its alternatives are set.

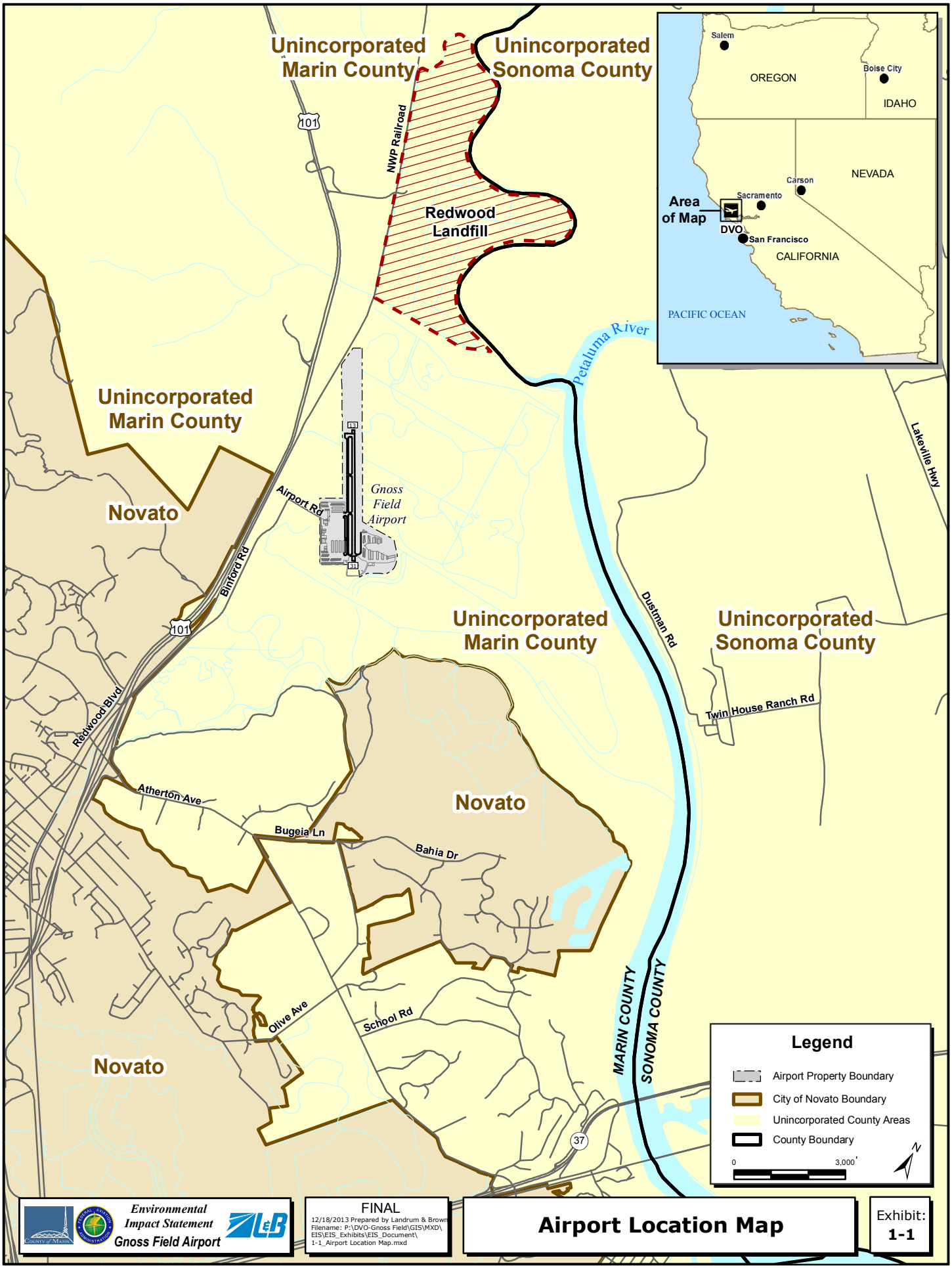
1.1 OWNERSHIP AND LOCATION

DVO is a general aviation airport owned and operated by Marin County, California. The Airport is located in unincorporated Marin County north of the City of Novato, California and serves as an essential regional transportation resource by providing general aviation facilities in the northern portion of the San Francisco Bay area. Public access to the Airport is available from the Atherton Road exit of Highway 101. **Exhibit 1-1, *Airport Location Map***, shows the location of the Airport.

1.2 AIRPORT HISTORY

Use of what became Gnoss Field Airport dates to 1939. In that year, William Wright, who owned the property, built a private grass-landing strip. After trying to sell his airport to Marin County for $1,000 an acre in 1945-1946, Wright leased the field to Woody Binford. In 1947, teamed with Jack Lewis, Mr. Binford built a 3,000-foot dirt runway, two hangars, an office, and opened a flying school. It operated until 1949, when a change in flight school training regulations ended its existence. In 1950, operation of the private field passed to Harry Tollefson, who ran the facilities until the late 1960s. During the late 1950s and early 1960s, the Marin County Board of Supervisors considered several sites for a County airport before finally deciding upon the present-day Gnoss Field Airport site. In 1965, the County, aided by Federal funding, bought the field, along with additional surrounding land, and named it after William Gnoss, the highly popular North Marin Supervisor who had worked for many years to expand aviation in Marin County. In 1968, a 3,300-foot by 60-foot, asphalt-paved runway and a facilities complex were built at the south end of the field.

The 1989 *Marin County Airport (Gnoss Field) Airport Master Plan* and *Update Chapter 6.0 – Airport Development Program Update 1997 – Marin County Airport Master Plans* adopted by the Marin County Board of Supervisors address the development of DVO. Due to concerns with the periodic presence of crosswind conditions (winds that blow across the runway rather than towards the ends of the runway) both the widening of Runway 13/31 and development of a crosswind runway were considered for DVO. Between 1997 and 2001, Runway 13/31 at DVO was widened to 75 feet, to address these periodic crosswind conditions, while the runway length remained unchanged.


Unincorporated Marin County
Unincorporated Sonoma County
NWP Railroad
101
Redwood Landfill
Petaluma River
Unincorporated Marin County
Novato
Airport Rd
Gnoss Field Airport
Binford Rd
Lakeville Hwy
Dustman Rd
Unincorporated Marin County
Unincorporated Sonoma County
Twin House Ranch Rd
Redwood Blvd
Atherton Ave
Novato
Bugeja Ln
Bahia Dr
Olive Ave
School Rd
Novato
MARIN COUNTY
SONOMA COUNTY
37
Salem
OREGON
Boise City
IDAHO
NEVADA
Carson
Sacramento
Area of Map
DVO
San Francisco
CALIFORNIA
PACIFIC OCEAN
Legend
Airport Property Boundary
City of Novato Boundary
Unincorporated County Areas
County Boundary
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3,000'
Environmental Impact Statement
Gnoss Field Airport
FINAL
12/18/2013 Prepared by Landrum & Brown
Filename: P:\DVO-Gnoss Field\GIS\MXD\EIS\EIS_Exhibits\EIS_Document\1-1_Airport Location Map.mxd
Airport Location Map
Exhibit: 1-1

Previous runways, which no longer exist at DVO, were oriented north-south (Runway 01/19) and northeast-southwest (Runway 06/24). The oldest buildings on-site were built in 1968 and 1969. The majority of the hangars were installed from the late 1970's through the early 1980's.[2,3] A system of levees has been constructed to protect the runway and Airport environment from flooding.

1.3 AIRPORT FACILITIES

The existing Airport facilities are shown in **Exhibit 1-2, *Existing Airport Layout***. As stated in the previous section, the airfield system consists of one 3,300 foot long runway (designated 13/31) that is oriented in northwest to southeast direction. The runway is 75 feet wide. A parallel taxiway, located 75 feet to the west of the runway provides access for aircraft to the runway ends. A helicopter landing pad, measuring 60-foot x 60-foot, is located at the southeast corner of the Airport property.

Runway end 13 is equipped with precision approach guidance through a published Global Positioning System (GPS) approach procedure. Both runway ends are equipped with a Precision Approach Path Indicator (PAPI).

The aircraft parking apron includes approximately 81 tie-downs, 147 T-hangars, and 37 conventional hangars, for a total parking capacity of approximately 265 aircraft.[4] Aviation fuel (100 Low Lead (LL) and Jet-A) is available for purchase from DT Group, LLC, the Fixed Base Operator located at DVO.[5]

1.4 AVIATION ACTIVITY

In accordance with FAA Order 5010.4, *Airport Safety Data Program,* public use airports are required to submit to the FAA Form 5010-1, which states the previous year's count of operations[6] broken down by category, as well as the based aircraft for the airport. The FAA Terminal Area Forecast (TAF) uses the 5010-1 forms as a basis for defining historical and forecast traffic.[7] Operational counts for airports such as Gnoss Field Airport that do not have an Airport Traffic Control Tower are often overestimated and are carried over year-after-year. A review of the 5010-1 form for DVO indicated that this is the case for Gnoss Field Airport. Operational numbers and based aircraft counts have been estimated based upon a combination of the 2004 BCA and information provided by DVO Airport Management.

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2 Tremaine and Associates, *Cultural Resources, Existing Conditions and Survey Methodology Report for the EIS and EIR to Evaluate the Proposed Extension of Runway 13/31 at Gnoss Field Airport*, 2009. See Appendix H, *Cultural Resources.*

3 Information obtained from Ken Robbins, Airport Manager, Gnoss Field Airport, 2009.

4 Landrum & Brown Analysis, 2009.

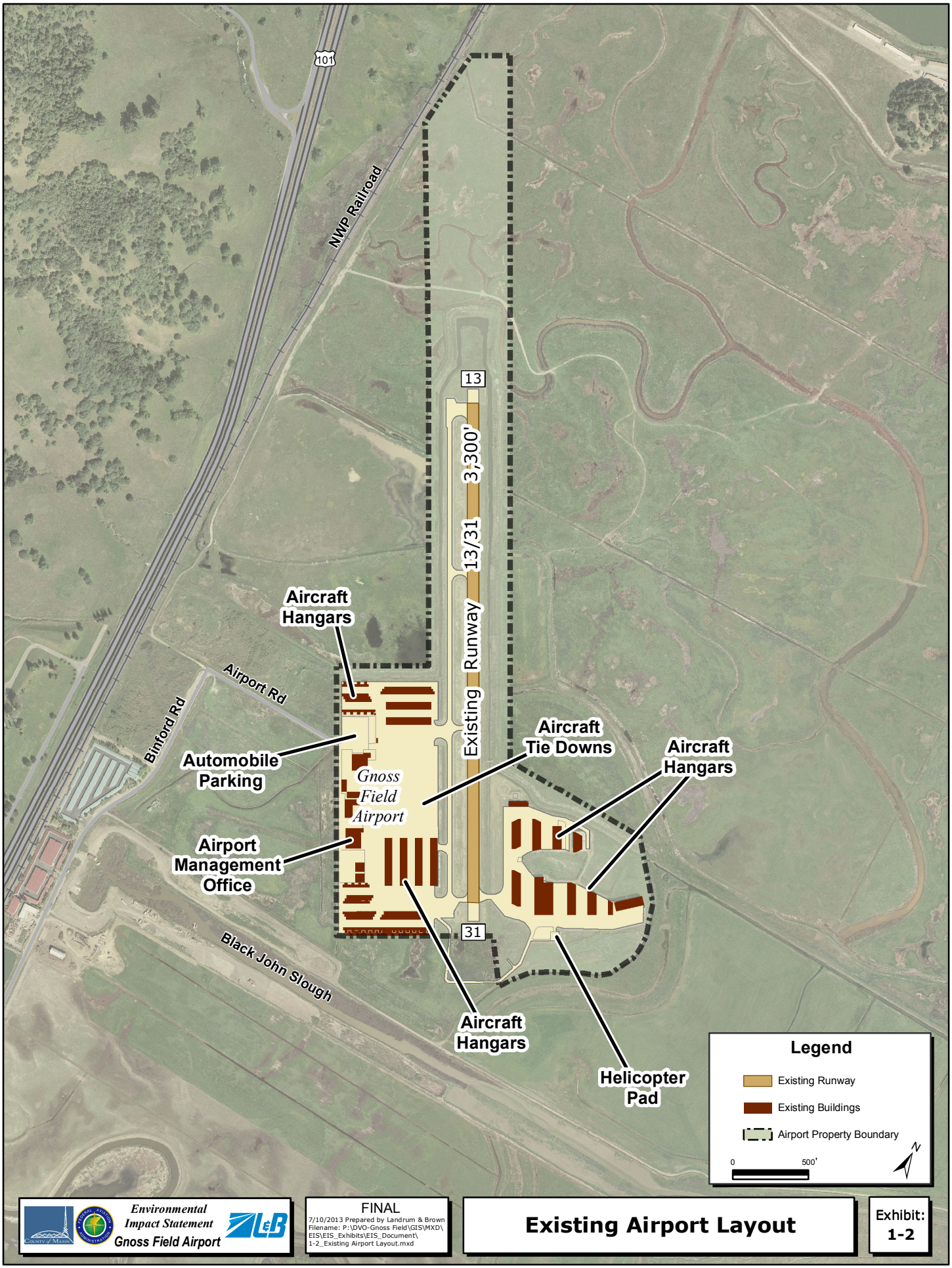
5 Marin County Airport at Gnoss Field, Marin County Public Works. On-line at: http://www.marincounty.org/depts/pw/divisions/airport Retrieved October 8, 2013.

6 One operation is defined as a takeoff or landing.

7 Background data on DVO traffic was gathered from the FAA Form 5010-1, FAA Terminal Area Forecasts, DVO Airport Management, and the *Marin County Airport Proposed Runway Extension Benefit Cost Analysis (BCA),* April 26, 2004. See Appendix C, *Aviation Activity Forecast* for detailed information.

The Airport Manager of Gnoss Field Airport conducted a count of current based aircraft in late March/early April of 2008. This count revealed 296 aircraft based at DVO, consisting of 248 single-engine piston aircraft, 18 multi-engine piston aircraft, 26 turbine aircraft, and 4 helicopters. The aviation forecast for DVO approved by the FAA on September 18, 2009 (Appendix C, *Aviation Activity Forecast*) found that the number of aircraft based at DVO is forecast to increase by 1.4 percent annually, from 297 in 2008 to 387 in 2027. The number of single-engine piston based aircraft is expected to increase slightly through 2027 (by 0.9 percent annually), while multi-engine piston aircraft would decrease slightly over this period (by -0.9 percent annually). These trends result from the fact that most of these aircraft become expensive to operate and maintain due to their old age. Turbine aircraft including Turbo-prop aircraft (aircraft with turbine engines and propellers) and Turbo-fan aircraft (aircraft with jet turbine engines) are projected to grow at an average annual rate of 5.0 percent while helicopters are forecast to increase by 2.9 percent annually. **Table 1-1** provides a summary of forecasted operating levels at DVO.

Itinerant and local general aviation operations are projected to continue to make up the majority of operations at DVO. There is currently no military activity at DVO and none is expected in the future. Overall, aircraft operations at DVO are forecast to increase from an estimated 85,500 operations in 2008 to 124,300 operations in 2027. This represents an average annual growth rate of two percent. The percentage of operations by each aircraft category (single-engine piston, multi-engine piston, turbine, and helicopter) is assumed to remain unchanged throughout the forecast period. The most recent economic recession has had a negative impact on general aviation. However, the expectation that turbine aircraft would be the primary growth segment for general aviation in the long term remains unchanged. FAA continues to project growth in active turbine aircraft of at least four percent per year over the next twenty years. In addition, the introduction of Very Light Jets into the general aviation market has been slower than expected due primarily to the filing of bankruptcy by the major manufacturer of the aircraft. See Appendix C for additional information.



Environmental Impact Statement
Gnoss Field Airport

FINAL
7/10/2013 Prepared by Landrum & Brown
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Existing Airport Layout

Exhibit: 1-2

Table 1-1
AIRCRAFT OPERATIONS FORECAST
Gnoss Field Airport

Year	GA Itinerant	GA Local	Air Taxi	Military	Total Operations
Estimated[1]					
2003	24,939	66,504	923	-	92,366
2004	25,700	63,800	1,200	-	90,700
2005	24,700	58,500	1,200	-	84,400
2006	25,300	59,700	1,200	-	86,200
2007	25,400	58,300	1,300	-	85,000
2008	26,000	58,100	1,400	-	85,500
2009	26,700	58,100	1,500	-	86,300
2010	27,700	58,400	1,700	-	87,800
2011	28,600	58,400	1,900	-	88,900
2012	29,600	58,500	2,000	-	90,100
Forecast					
2013	30,500	58,700	2,200	-	91,400
2014	31,500	58,900	2,400	-	92,800
2015	32,500	59,500	2,500	-	94,500
2016	33,500	60,000	2,700	-	96,200
2017	34,500	60,900	2,800	-	98,200
2018	35,600	62,000	2,900	-	100,500
2019	36,600	63,000	3,100	-	102,700
2020	37,700	64,100	3,200	-	105,000
2021	38,700	65,200	3,300	-	107,200
2022	39,800	66,300	3,500	-	109,600
2023	40,900	67,700	3,600	-	112,200
2024	42,000	69,100	3,800	-	114,900
2025	43,200	70,800	3,900	-	117,900
2026	44,400	72,600	4,000	-	121,000
2027	45,700	74,400	4,200	-	124,300
Average Annual Growth Rates:					
2003-2008	0.8%	-2.7%	8.7%	0.0%	-1.5%
2008-2013	3.2%	0.2%	9.5%	0.0%	1.3%
2013-2018	3.1%	1.1%	5.7%	0.0%	1.9%
2018-2027	2.8%	2.0%	4.2%	0.0%	2.4%
2008-2027	**3.0%**	**1.3%**	**6.0%**	**0.0%**	**2.0%**

1. Updated to show that the values prior to 2013 are now historical estimated and values for 2013 and later are forecasted values.

Note: When preparing Aviation Activity Forecasts, it is standard practice to forecast 20 years in the future from the existing year. The forecasting effort for this EIS began in 2007 and as a result the forecast projected out to the year 2027.

Sources: FAA Form 5010-1, FAA Aerospace Forecast 2010-2031, Airport User Interviews, 2004 Proposed Runway Extension Benefit Cost Analysis, Gnoss Field Airport Management, Landrum & Brown Analysis.

1.5 SPONSOR'S GOALS AND OBJECTIVES

As the Airport sponsor, Marin County has identified the following goals and objectives for the Airport and this project:

1. To make improvements at DVO that are consistent with the 2007 Marin Countywide Plan, the 1997 Update of the Airport Master Plan, and the 1991 Airport Land Use Plan.
2. To make improvements at DVO that are consistent with FAA Advisory Circular 150/5300-13A *Airport Design,*[8] airport design standards for a B-I (small) Design Group Airport intended to serve aircraft with a wing span of less than 49 feet, maximum certificated takeoff weight of 12,500 pounds or less, and an approach speed of 91 to 121 knots.
3. To extend the length of the existing runway at DVO to allow the existing aircraft, as represented by the critical aircraft[9], to operate efficiently during all weather conditions.

1.6 SCOPING AND EARLY COORDINATION

As a requirement of FAA Orders 1050.1E, Change 1, *Environmental Impacts: Policies and Procedures* and 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions,* a scoping process must be conducted to provide the opportunity for public and agency participation during the preparation of an EIS. Guidelines for conducting such scoping processes are contained within the Council on Environmental Quality (CEQ) Regulations, 40 CFR § 1501.7, which states that "there shall be an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to the proposed action. This process shall be termed scoping."

The FAA, in cooperation with Marin County, completed a number of scoping activities to determine the range of issues to be analyzed, and to what magnitude they were to be treated in this EIS. These activities included:

- Early written coordination with Federal, State of California, and local resource agencies;
- Filing of a Notice of Intent to Prepare an Environmental Impact Statement and hold Scoping Meeting; Gnoss Field, Marin County, California; and
- Conducting an agency scoping meeting and a public scoping meeting.

[8] This EIS was initially prepared using the earlier version of this Advisory Circular. FAA revised the Advisory Circular effective on September 28, 2012. The particular design standards related to the proposed project reviewed in this EIS did not change in the updated version of the Advisory Circular.

[9] The critical aircraft for DVO is Cessna Citation 525 (Cessna 525) business jet. See Chapter Two, *Purpose and Need*, and Appendix D, Attachment 1, *Basis for Determination of the Critical Aircraft for DVO*, for details regarding this determination.

In an effort to identify potential issues associated with the Sponsor's Proposed Project, coordination letters were mailed to key agencies responsible for resource protection and public policy. These letters requested responses from Federal, State, and local agencies which might have information pertaining to natural and human resources and their locations within the study area. A copy of the FAA coordination letters and a list of agency addresses are included in Appendix A, *Agency Scoping and Coordination,* as well as*,* copies of the response letters received from these agencies.

The FAA conducted an Agency Scoping Meeting at 1:00 p.m. on August 14, 2008, at the Marin County Civic Center. Members of the FAA, EIS consultant team, and Marin County were available to respond to questions and discuss issues. Copies of sign-in sheets and other meeting materials for the Agency Scoping Meeting are included in Appendix A.

In general, agency comments during scoping focused on four specific areas. **Table 1-2** provides a summary list of the topics commented on and the location within the document where these issues are addressed.

Table 1-2
AGENCY COMMENTS RECEIVED DURING SCOPING
Gnoss Field Airport

GENERAL COMMENT	AGENCY	EIS SECTION
There may be a requirement to prepare a Lake and Streambed Alteration Agreement (LSAA)	California Department of Fish and Game (CDFG)	If a LSAA agreement is required, Marin County would work with the CDFG to coordinate this process.
A Hazardous Air Pollutant survey be completed	U.S. Environmental Protection Agency (USEPA)	Chapter Four, Affected Environment and Appendix F, Air Quality
Request that FAA consider all pertinent emergency service regulations in the design and assessment of the proposed runway extension	Novato Fire protection Division	Chapter Five, Section 5.4, Secondary (Induced) Impacts
Concern about the proximity of the Redwood Landfill and the potential for the project to bring aircraft closer to the landfill	Marin County Environmental Health Services	Chapter Six, Cumulative Impacts.

A Public Scoping Meeting was held at 6:30 p.m. on August 14, 2008, at the Marin Humane Society Auditorium, Novato, California. This meeting, afforded the general public an opportunity to review and comment on the preliminary environmental analysis and the Sponsor's Proposed Project. Members of the FAA, EIS consultant team, and Marin County made a presentation about the project and were available to listen to questions from the public. Copies of the sign-in sheets, advertising, and other meeting materials used for the Public Scoping Meetings are provided in

Appendix B, *Public Involvement*. Comment forms were provided at the scoping meetings to solicit and encourage written comments. Copies of all public comments received are provided in Appendix B.

In general, public comments focused on eight specific areas. **Table 1-3** provides a summary list of the topics commented on and the location within the document where these issues are addressed.

Table 1-3
PUBLIC COMMENTS RECEIVED DURING SCOPING
Gnoss Field Airport

GENERAL COMMENT	EIS SECTION
Concerns about aircraft noise and overflights	Chapter Five, Section 5.1, Noise
Concerns about greenhouse gas emissions	Chapter Four, Affected Environment and Appendix F, Air Quality
Concerns about climate change	Appendix F, Air Quality
Concerns about impacts to wetlands	Chapter Four, Affected Environment and Chapter Five, Section 5.10, Wetlands
Concerns about impacts to water quality	Chapter Four, Affected Environment and Chapter Five, Section 5.6, Water Quality
Requests for a more clear and full definition of the project's purpose and need	Chapter Two, Purpose and Need and Appendix C, Aviation Activity Forecast and Appendix D, Runway Length Analysis
Concerns about the proximity of the Redwood Landfill	Chapter Six, Cumulative Impacts.
Suggestions that the EIS include a discussion of the cumulative impacts of this project	Chapter Six, Cumulative Impacts addresses the Sponsor's Proposed Project in addition to other projects in the area.

1.7 COMMENT PERIOD AND PUBLIC HEARING

The Draft EIS was published on December 9, 2011. The public comment period was open from December 9, 2011 to February 6, 2012. As a requirement of FAA Order 1050.1E, Change 1 and FAA Order 5050.4B, a Public Hearing was held on January 10, 2012 to offer the public the opportunity to provide comments on the information contained in the Draft EIS. Marin County circulated a Final EIR for public review on November 8, 2013 and certified the Final EIR on February 11, 2014. Comments received on the Draft EIS and responses to those comments are included in Appendix P, *Comments Received on Draft EIS/Draft EIR*, and Appendix Q, *FAA Response to Comments*.

In general, agency comments during the comment period for the Draft EIS focused on eight specific areas. **Table 1-4** provides a summary list of the topics commented on. All of these comments are addressed in Appendix Q, as well the location within the document noted in the table.

Table 1-4
AGENCY COMMENTS RECEIVED DURING COMMENT PERIOD
Gnoss Field Airport

GENERAL COMMENT	AGENCY	EIS SECTION
Purpose and need is narrowly defined	USEPA	Chapter Two, Purpose and Need
Concerns about the aviation forecast	USEPA	Chapter One, Background, Chapter Two, Purpose and Need and Appendix C, Aviation Activity Forecast
All practicable alternatives were not considered	USEPA	Chapter Three, Alternatives
Runway extension will result in an increase in operations and larger aircraft	USEPA	Chapter One, Background, Chapter Two, Purpose and Need and Appendix C, Aviation Activity Forecast
Potential impacts to CDFG wildlife area	CDFG	Chapter Five, Section 5.9, Fish, Wildlife, and Plants and Appendix I, Biological Resources
Wetland mitigation	CDFG	Chapter Five, Section 5.10, Wetlands and Streams and Appendix J, Wetlands
Specific comments regarding construction activities within a floodplain	Federal Emergency Management Agency (FEMA)	Chapter Five, Section 5.11, Floodplains
Provided specific comments related to the Redwood Landfill, in particular clarifications related to the existing permit	Marin County	Chapter Five, Section 5.9, Fish, Wildlife, and Plants

In general, public comments during the comment period for the Draft EIS focused on nine areas. **Table 1-5** provides a summary list of the topics commented on. All of these comments are addressed in Appendix Q, as well the location within the document noted in the table.

Table 1-5
PUBLIC COMMENTS RECEIVED DURING COMMENT PERIOD AND PUBLIC HEARING
Gnoss Field Airport

GENERAL COMMENT	EIS SECTION
Concerns about the aviation forecast	Chapter One, Background, Chapter Two, Purpose and Need and Appendix C, Aviation Activity Forecast
Concerns about runway length analysis	Appendix D, Runway Length Analysis
Concerns about aircraft noise and overflights	Chapter Five, Section 5.1, Noise and Appendix E, Noise
Concerns about induced off-airport growth	Chapter Five, Section 5.2, Land Use and Appendix O, Land Use Assurance Letter
Concerns about climate change	Appendix F, Air Quality
Concerns about impacts to wetlands	Chapter Five, Section 5.10, Wetlands and Streams and Appendix J, Wetlands
Concerns about impacts to water quality	Chapter Five, Section 5.6, Water Quality and Appendix G, Water Quality
Purpose and need is narrowly defined	Chapter Two, Purpose and Need
All practicable alternatives were not considered	Chapter Three, Alternatives

CHAPTER TWO
PURPOSE AND NEED

This chapter of the Environmental Impact Statement (EIS) describes the purpose and need for the proposed improvements at Gnoss Field Airport (DVO or Airport) and identifies Federal Aviation Administration (FAA) regulations and policies for aviation safety and the potential Federal approvals that would be required for the proposed project to be implemented. FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* requires that an EIS fully address and convey the purpose and need for a proposed project. According to the Council on Environmental Quality (CEQ) and their implementing regulations for NEPA, the purpose and need shall briefly specify the underlying purpose and need. In this EIS, the FAA considers the reasonable alternatives that meet the purpose and need of DVO and Marin County. The purpose and need for the proposed improvements serves as the foundation for the identification of reasonable alternatives to the Proposed Project and the comparative evaluation of impacts of development. In order for an alternative to be considered viable and carried forward for detailed evaluation within the NEPA process and this EIS, it must address the needs, as described more fully in the following sections.

The Airport is located in unincorporated Marin County north of the City of Novato, California and serves as an essential regional transportation resource by providing general aviation facilities in the northern portion of the San Francisco Bay area. People choose to use DVO for three primary purposes – flight training, recreation, and business travel. DVO has been defined by the FAA as a reliever airport in the Bay area and served approximately 85,500 arrivals and departures in 2008.[1] A reliever airport is a high-capacity general aviation airport in a major metropolitan area.[2] The FAA defines "capacity" as the "throughput rate" of an airport, i.e., the maximum number of aircraft operations that can take place in an hour.[3]

Reliever airports provide pilots with attractive alternatives to using congested hub airports. They also provide general aviation access to the surrounding area. To be eligible for reliever designation, these airports must be open to the public, have 100 or more based aircraft, or have 25,000 annual itinerant operations. The 268 reliever airports have an average of 184 based aircraft, which in total represents 22 percent of the Nation's general aviation fleet.

The reliever program, which was established in 1962, has evolved over the years. Currently, many of the airports designated as relievers serve their own economic and operational role. DVO and other general aviation airports in the San Francisco Bay area designated as reliever airports serve to reduce congestion at San

1 Appendix C, *Aviation Activity Forecast*.
2 2013-2017 National Plan of Integrated Airport Systems (NPIAS).
3 FAA Advisory Circular 150/5060-5 *Airport Capacity and Delay*, September 23, 1983, page 1, paragraph 3.

Francisco International Airport, Oakland International Airport, and San Jose International Airport. Therefore, the FAA has encouraged the development, maintenance, and expansion of general aviation airports in major metropolitan areas.

2.1 PURPOSE AND NEED FOR IMPROVEMENTS

The following sections present the Sponsor's and FAA's purpose and need.

2.1.1 SPONSOR'S PURPOSE AND NEED

Gnoss Field Airport is designed to accommodate aircraft with a wingspan of 49 feet or less, and an approach speed of 91 to 121 knots (FAA Airport Reference Code B-1). Examples of different sizes of aircraft by Airport Reference Code are shown in **Table 2-1**.

Marin County has prepared several evaluations of the Airport's operations and facilities, including the 1989 Airport Master Plan[4], the 1997 Update of the Airport Master Plan[5], the 2002 Preliminary Design Report for the proposed runway extension[6], and the evaluations leading up to the preparation of this EIS[7]. These studies identified the limitations regarding the Airport's ability to accommodate existing aircraft and aviation users for which the Airport was designed. Specifically, the Airport cannot fully accommodate existing aviation activity, as represented by the critical aircraft, the Cessna 525, an Airport Reference Code B-1 business jet[8] that regularly uses the Airport, under hot weather and other adverse weather conditions.[9]

The existing runway at DVO is 3,300 feet long and as a result cannot fully accommodate the operations of the critical aircraft. Therefore, the purpose of the Sponsor's Proposed Project is to:

> ***allow existing aircraft, as represented by the critical aircraft at DVO, to operate at Maximum Gross Take Off Weight under hot weather and other adverse weather conditions.***

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4 *Airport Master Plan Marin County Airport Gnoss Field*, 1989.

5 Marin County Aviation Commission Resolution No. 97-1: *A Resolution Adopting Chapter 6.0 – Airport Development Program Update 1997 – Marin County Airport Master Plan (Gnoss Field) and Recommendation of Approval of Chapter 6.0 1997 Update to the Marin County Board of Supervisors, February 5, 1997.*

6 Cortright & Seibold, *Preliminary Design Report, Runway Extension, Gnoss Field*, 2002.

7 Landrum & Brown*, Gnoss Field Airport Runway Length Analysis, 2008 & 2013.* (Appendix D of this EIS).

8 The critical aircraft for DVO is the Cessna 525 business jet, also known as the Cessna Citation 525 or Citation CJ1+. See Appendix D, Attachment 1, *Basis for Determination of the Critical Aircraft for DVO*, and the remainder of Chapter Two for details regarding the how the critical aircraft was determined.

9 For the purpose of this EIS, hot weather is defined as the mean daily maximum temperature of the hottest month at the Airport (FAA A/C 150/5325-4B paragraph 506) and adverse weather conditions include wet runways, icy runways, and crosswinds.

Table 2-1
AIRPORT REFERENCE CODES FOR AIRCRAFT TYPICALLY OPERATING AT GNOSS FIELD AIRPORT
Gnoss Field Airport

AIRPORT REFERENCE CODE[1]	AIRCRAFT CHARACTERISTICS	EXAMPLE AIRCRAFT TYPE
A-I	**Approach Speed:** Less than 91 knots **Wingspan:** Less than 49 feet	**Cessna 172** 
B-I	**Approach Speed:** 91 knots or greater, but less than 121 knots **Wingspan:** Less than 49 feet	**Cessna 525 (critical aircraft)[2]** 
B-II	**Approach Speed:** 91 knots or greater, but less than 121 knots **Wingspan:** 49 feet or greater, but less than 79 feet	**Beechcraft Super King Air 200** 

1 Source: FAA Advisory Circular 150/5300-13A *"Airport Design"*
2 ***Cessna 525*** is the critical aircraft for DVO.

2.1.2 FAA PURPOSE AND NEED

The FAA's statutory mission is to ensure the safe and efficient use of navigable airspace in the U.S. as set forth under 49 USC § 47101 (a)(1). The FAA must ensure that the proposed action does not derogate the safety of aircraft and airport operations at DVO. Moreover, it is the policy of the FAA under 49 USC § 47101(a)(6) that airport development projects provide for the protection and enhancement of natural resources and the quality of the environment of the United States.

2.1.3 INSUFFICIENT RUNWAY LENGTH

FAA Order 5090.3C *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*[10] identifies that airport dimensional standards such as runway length and width, separation standards (distances) between runways and taxiways, surface gradients, and similar dimensions should be appropriate for the "critical aircraft" that will make "substantial use" of the airport in the planning period for improvements.

An aircraft is called the "critical aircraft" because it is the most "demanding" aircraft in terms of the physical dimensions of the airport such as the length and width of the runways and taxiways, and separation distance between runways and taxiways required for that aircraft to operate at the airport. "Substantial use" of a general aviation airport is defined as 500 or more annual itinerant operations (i.e., 500 arrivals and/or departures from the airport). The FAA uses the requirements of an airport's critical aircraft as a basis for determining when new aviation development is justified. This type of evaluation is consistently applied across the aviation industry and is the recognized approach for determining the needs of an airport. For DVO, the critical aircraft was determined to be the Cessna 525 business jet. See Appendix D, Attachment 1, *Basis for Determination of the Critical Aircraft for DVO*, for more information regarding the designation of the Cessna 525 as the critical aircraft for DVO.

The Marin County Aviation Commission Resolution No. 97-1: *A Resolution Adopting Chapter 6.0 Airport Development Program Update 1997*[11] identified a runway extension as a part of DVO's future development program and a proposed runway length was developed as part of the 2002 Preliminary Design Report[12]. During the preparation of this EIS FAA Advisory Circular (AC) 150/5325-4B *Runway Length Requirements for Airport Design*, was used to verify an appropriate length for Runway 13/31 at DVO. FAA AC 150/5325-4B, Paragraph 202, *Design Approach*, provides the acceptable methods to determine a recommended runway length. For this EIS, the airport planning manual (APM) for the critical aircraft, the Cessna 525, was used to verify the necessary runway length. A summary of the procedure used to verify the necessary runway length for the runway at DVO to accommodate the Cessna 525 under hot weather and other adverse weather conditions is shown in **Table 2-2** in this chapter and described in detail in Appendix D, *Runway Length Analysis.*

Based on the runway length analysis described above, the need at DVO is to address insufficient runway length that precludes the critical aircraft from operating at maximum gross take off weight under hot weather and other adverse weather conditions.

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[10] FAA Order 5090.3C *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS) 3-4 Airport Dimensional Standards*. December 4, 2000.

[11] Marin County Aviation Commission Resolution No. 97-1: *A Resolution Adopting Chapter 6.0 – Airport Development Program Update 1997 – Marin County Airport Master Plan (Gnoss Field) and Recommendation of Approval of Chapter 6.0 1997 Update to the Marin County Board of Supervisors, February 5, 1997.*

[12] Cortright & Seibold, *Preliminary Design Report, Runway Extension, Gnoss Field*, 2002.

Table 2-2
SUMMARY OF RUNWAY LENGTH DETERMINATION FOR DVO USING AN AIRPORT PLANNING MANUAL (APM) FOR CESSNA 525
Gnoss Field Airport

VARIABLE FACTORS		AIRPLANE PERFORMANCE CHARACTERISTICS TURBOJET (UTILIZING AIRPLANE MANUFACTURER'S AIRPLANE FLIGHT MANUALS (APM[i]) CHAPTER 4)
Airplane Type		Cessna 525[ii]
Flap Setting		15° Flaps for Takeoff performance, "Land" for Landing performance
Operating Weights	Takeoff	MTOW – 10,700 lbs.[iii]
	Landing	MLW – 9,900 lbs.
Airport Elevation		Sea Level
Temperature	Takeoff	86° F[iv]
	Landing	86° F
Wind	Takeoff	Zero wind
	Landing	Zero wind
Runway Surface Conditions	Takeoff	Wet (turbo)
	Landing	Wet (turbo)
Difference in Centerline Elevation	Takeoff	Zero
	Landing	n/a
Runway Length for Takeoff		4,400 ft. (rounded from 4,390 ft.)
Runway Length for Landing		3,100 ft. (rounded from 3,093 ft.)

Table Notes:

i. FAA Approved Airplane Flight Manual Citation CJ1+ Model 525, Cessna Aircraft Company, Revision 3 March 27, 2012 was the APM used to obtain the identified values.

ii. Cessna 525 was identified as the critical aircraft based on the number of annual operations estimated to exceed 500 and the runway length requirements of the aircraft exceeding those of the other aircraft operating at DVO.

iii. Maximum Takeoff Weight (MTOW) was selected for this analysis because it is typical to use MTOW for general aviation airports where destinations are not readily available and can change dependent upon the specific requirements of individual passengers. In addition, an analysis of radar data for DVO found that typical destinations for the Cessna 525 and other business jets operating from DVO were at a distance where MTOW would be the selected weight if a payload analysis were conducted.

iv. The mean daily maximum temperature of the hottest month for DVO is 82° F. The Cessna 525 Airplane Flight Manual does not identify a runway length for 82° F. Therefore, the closest/higher temperature available (86° F) was used to ensure that the runway length analysis did not underestimate runway length. This methodology was confirmed through a telephone conversation between Landrum and Brown and a Sr. Customer Support Engineer at Cessna Aircraft Company, on April 12, 2013. Cessna confirmed that it was appropriate to use the higher temperature value to calculate runway length for a mean daily maximum temperature of 82°, Record of telephone conversation is in Administrative File.

2.2 SPONSOR'S PROPOSED PROJECT

Marin County developed the Sponsor's Proposed Project through the Master Plan for Marin County Airport[13] the Marin County Aviation Commission Resolution No. 97-1: *A Resolution Adopting Chapter 6.0 Airport Development Program Update 1997*[14] and the Preliminary Design Report Runway Extension Gnoss Field.[15] **Exhibit 2-1, *Existing Airport Layout***, shows the existing Airport location and facilities. The primary elements of the Sponsor's Proposed Project, which are shown on the 2000 Airport Layout Plan (ALP), and also shown on **Exhibit 2-2, *Sponsor's Proposed Project***, include the following:

- Extend Runway 13/31 1,100 feet to the northwest from 3,300 feet to a total length of 4,400 feet while maintaining the 75-foot width of the runway;
- Extend the parallel taxiway to the full length of the runway;
- Extend the existing Runway Safety Area (RSA) along the sides of Runway 13/31 to maintain the existing RSA width of 120 feet centered on the runway centerline;
- Extend RSA to 240 feet long beyond each end of Runway 13/31 to meet current FAA B-I airport design standards;
- Corresponding realignment of drainage channels to drain the extended runway and taxiway;
- Corresponding levee extension to protect the extended runway and taxiway from flooding;
- Relocate the navigational aids (PAPI) that pilots use to land at the Airport to reflect the extended runway; and
- Acquire 0.1 acre of land south of the Airport to provide for a 240-foot long RSA on the south end of Runway 13/31.

Marin County intends to keep DVO open during construction of the proposed project. Any modifications to Airport operations necessary to maintain safety during construction would be addressed in a Construction Safety and Phasing Plan prepared in accordance with FAA AC 150/5370-2F, *Operational Safety on Airport During Construction,* and approved by the FAA.

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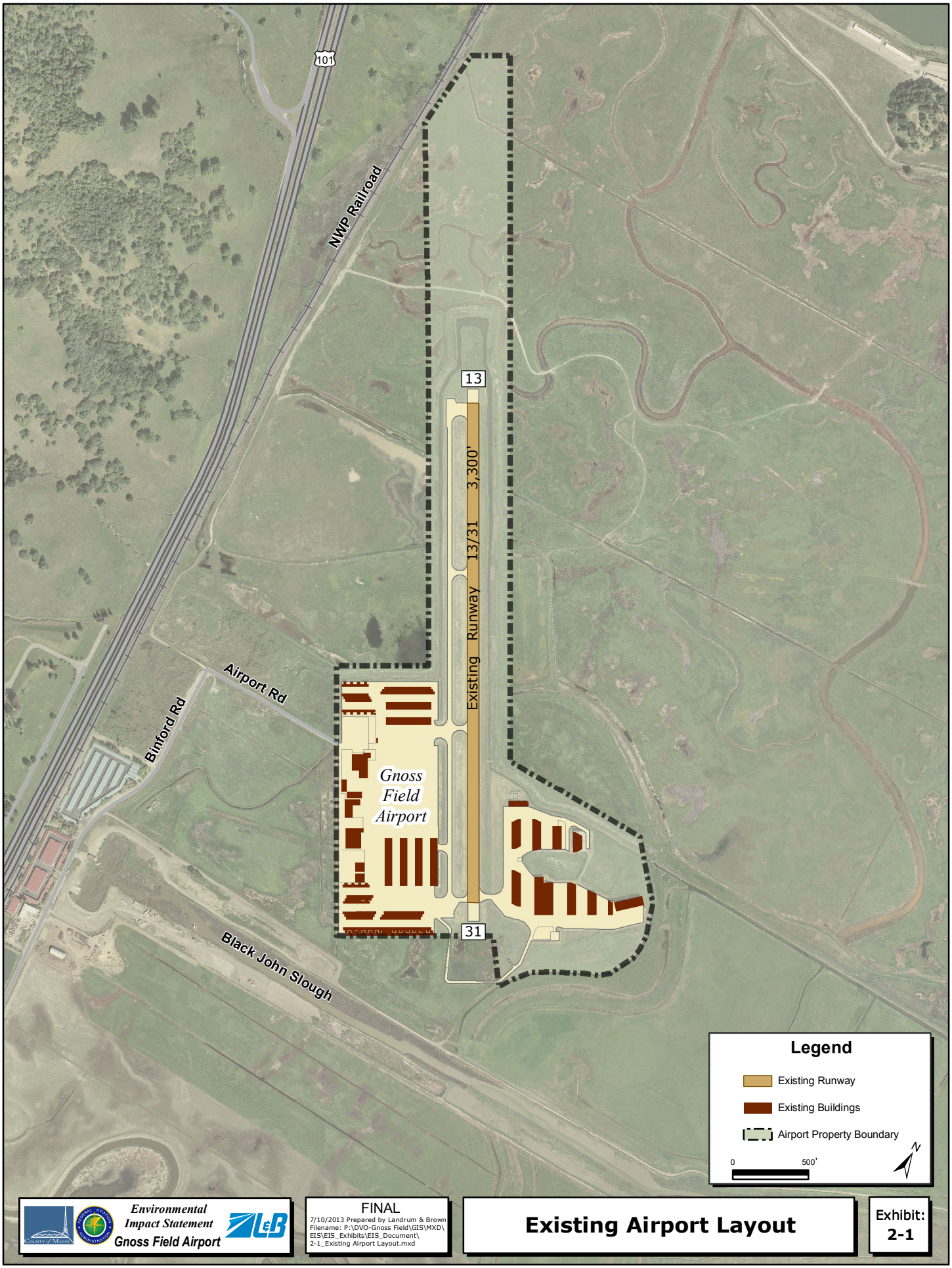
13 *Airport Master Plan Marin County Airport Gnoss Field*, 1989.

14 Marin County Aviation Commission Resolution No. 97-1: *A Resolution Adopting Chapter 6.0 – Airport Development Program Update 1997 – Marin County Airport Master Plan (Gnoss Field) and Recommendation of Approval of Chapter 6.0 1997 Update to the Marin County Board of Supervisors, February 5, 1997.*

15 Cortright & Seibold, *Preliminary Design Report, Runway Extension, Gnoss Field*, 2002.

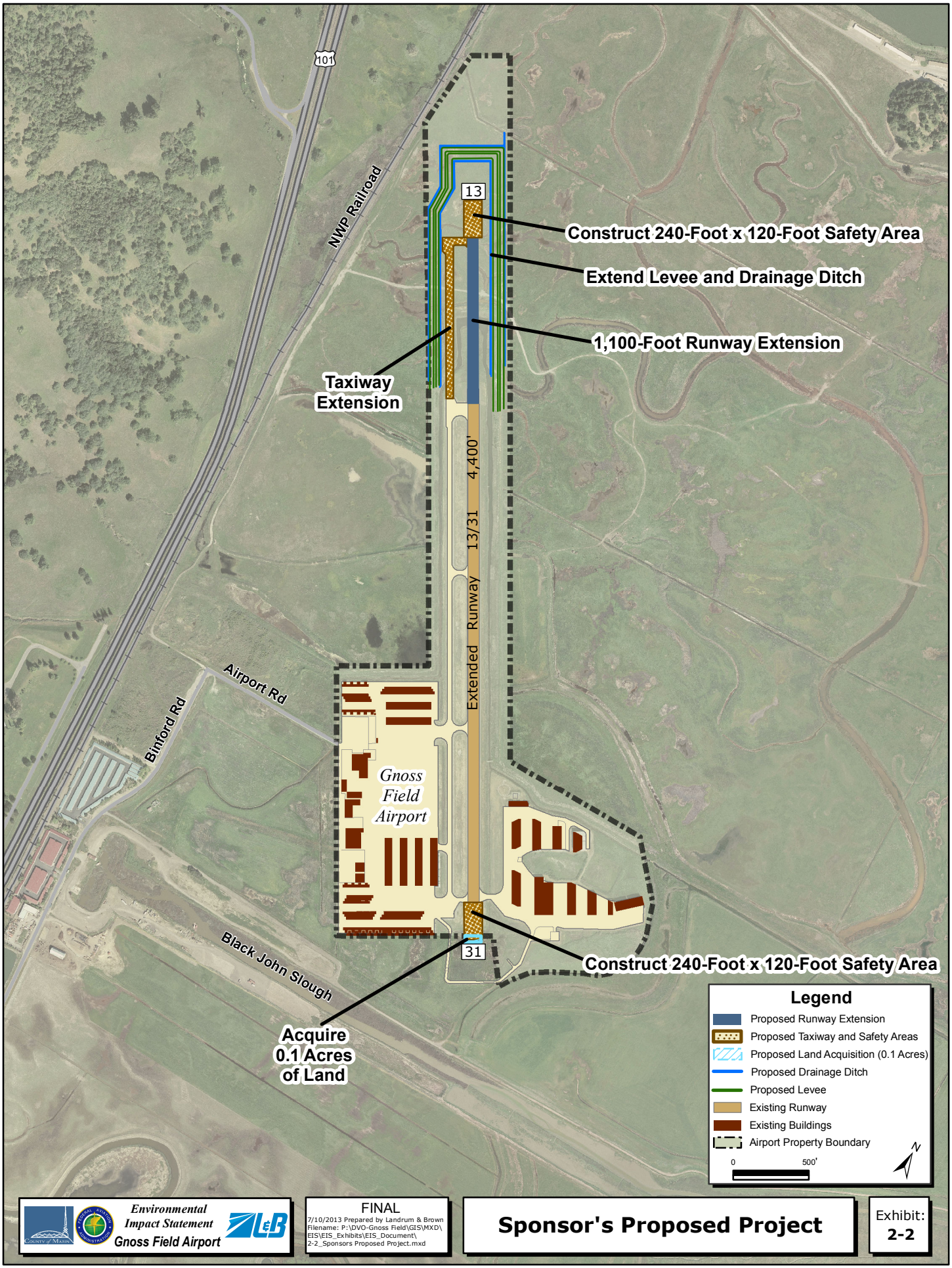


Environmental Impact Statement
Gnoss Field Airport

FINAL
7/10/2013 Prepared by Landrum & Brown
Filename: P:\DVO-Gnoss Field\GIS\MXD\EIS\EIS_Exhibits\EIS_Document\2-1_Existing Airport Layout.mxd

Existing Airport Layout

Exhibit: 2-1



Environmental Impact Statement
Gnoss Field Airport

FINAL
7/10/2013 Prepared by Landrum & Brown
Filename: P:\DVO-Gnoss Field\GIS\MXD\EIS\EIS_Exhibits\EIS_Document\2-2_Sponsors Proposed Project.mxd

Sponsor's Proposed Project

Exhibit: **2-2**

2.3 PROPOSED FEDERAL ACTIONS

Several Federal actions are directly or indirectly proposed to occur. Implementation of the Sponsor's Proposed Project or other build alternatives would require several Federal actions and approvals. These include:

- Unconditional approval of the Airport Layout Plan (ALP) to depict the land acquisition, proposed runway extensions and parallel taxiway extension pursuant to 49 United States Code (USC) §§ 40103(b) and 47107(a)(16);
- Development of air traffic control and airspace management procedures designed to affect the safe and efficient movement of air traffic to and from the proposed runway development. Such actions would include, but are not limited to, the establishment or modification of flight procedures and the installation and/or relocation of Navigational Aids (NAVAIDs) associated with the proposed runway and taxiway extension.
- Determination of eligibility for federal assistance for the proposed projects under the Federal grant-in-aid program authorized by the Airport and Airway Improvement Act of 1982, as amended (49 USC § 47101 et seq.);
- Determinations under 49 USC §§ 47106 and 47107 relating to the eligibility of the Proposed Action for federal funding under the Airport Improvement Program (AIP) to assist with construction of potentially eligible development items shown on the ALP;
- Determination of the effects of the proposed extension of the runway and parallel taxiway and the corresponding increase in size of the associated runway safety area upon the safe and efficient use of navigable airspace pursuant to Title 14 Code of Federal Regulations (CFR) Part 77, Objects Affecting Navigable Airspace. The FAA must determine if the proposed improvements, as proposed by Marin County are consistent with the existing airspace utilization and procedures;
- Determination under 49 USC § 44502(b) that the airport development is reasonably necessary for use in air commerce or in the interests of national defense;
- Approval of further processing of an application for federal assistance for near-term eligible projects using federal funds from the Airport Improvement Program, as shown on the ALP; and
- Approval of a Construction Safety and Phasing Plan to maintain aviation and airfield safety during construction pursuant to FAA Advisory Circular 150/5370-2F *Operational Safety on Airports During Construction*.

The proposed improvements under consideration in this EIS, and described as Alternatives B and D in Chapter Three, are designed to allow the Airport to accommodate existing aviation traffic and passenger demand.

2.4 COORDINATION WITH OTHER LAWS AND STATUTES

The FAA prepared this EIS, in accordance with the provisions of the CEQ regulation, Title 40 CFR § 1506.2, which directs Federal agencies to cooperate with state and local agencies "to the fullest extent possible" to reduce duplication between the NEPA and comparable state and local requirements. As such, this chapter complies with California State Water Resources Control Board implementation of federal Clean Water Act (CWA) Section 401 Water Quality Certification requirements, per California Code of Regulations (CCR) 23 CCR § 3949.2, demonstrating public need for the project. In addition, this EIS addresses the requirements of the U.S. Army Corp of Engineers, Section 404 process for impacts to waters within the CWA jurisdiction, as well as National Historic Preservation Act, Section 106, consultations for impacts to historic properties, as identified in Title 36 CFR § 800.8, *Coordination with the National Environmental Policy Act*. This EIS also addresses the requirements of the U.S. Department of Transportation Act of 1966, Section 4(f).[16]

2.5 TIME FRAME FOR FEDERAL ACTIONS

The FAA issued a Federal Register Notice on July 11, 2008 (see Appendix A, *Agency Scoping and Coordination*), announcing its intent to prepare an EIS for the proposed improvements at DVO. In addition, Marin County issued a Notice of Preparation of an Environmental Impact Report (EIR) on July 11, 2008 (see Appendix A). The FAA issued a Notice of Availability and released the Draft EIS for a 60-day public review on December 9, 2011, held a public hearing to receive comments on the Draft EIS on January 10, 2012, and accepted public comments on the EIS through February 6, 2012. Marin County concurrently issued its EIR for this project on December 9, 2011, and accepted comments on its EIR through February 6, 2012. The FAA has reviewed and responded to all comments on the Draft EIS in this Final EIS. Appendix Q, *Response to Comments* provides responses to all comments received on the Draft EIS. The FAA may issue a Record of Decision (ROD) regarding the Federal actions in this Final EIS 30 days after the release of this Final EIS to the public.

If the FAA issues a ROD to support proceeding with the Sponsor's Proposed Project, Marin County could then seek Federal funding through the Airport Improvement Program grant program to assist in implementation of the project. Marin County would have to meet Federal, state and local environmental requirements, including complying with the California Environmental Quality Act, in order to proceed with the project.

[16] Section 4(f) of the Department of Transportation Act of 1966 is currently codified as 49 USC § 303(c). Consistent with FAA Order 1050.1E, Appendix A, paragraph 6.1a, Section 303(c) will be referred to as Section 4(f).

CHAPTER THREE
ALTERNATIVES

3.1 INTRODUCTION AND BACKGROUND

The Council on Environmental Quality regulations (Title 40 Code of Federal Regulations [CFR] § 1502.14) for, implementing the National Environmental Policy Act (NEPA) of 1969, require that Federal agencies perform the following tasks:

- Rigorously explore and objectively evaluate all reasonable alternatives and, for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated;
- Devote substantial treatment to each alternative considered in detail, including the Proposed Action, so that reviewers may evaluate their comparative merits;
- Include reasonable alternatives not within the jurisdiction of the lead agency; and
- Include the alternative of no action.

3.2 RANGE OF ALTERNATIVES

The analysis of EIS alternatives was an independent examination by the Federal Aviation Administration (FAA) using a two-step screening process. The first step in the screening process was to identify if an alternative could meet the purpose for the Sponsor's Proposed Project as described in detail in Chapter Two, *Purpose and Need.* Alternatives that did not meet the purpose for the project were excluded from further review. The second step was to further evaluate the remaining alternatives for additional considerations, including significant environmental, operational, cost considerations, and reasonable, possible and prudent alternative considerations. These considerations were associated with direct impacts on existing facilities that would result in substantial redevelopment, or inhibit development or maintenance of existing transportation infrastructure. The following summarizes the considerations used in the alternatives evaluation:

- **Environmental Considerations:** Alternatives with substantially higher adverse impacts beyond those of the Sponsor's Proposed Project were not evaluated in detail. The EIS also recognized the *Clean Water Act* Section 404(b)(1) guidelines, which provides that the U.S. Army Corps of Engineers (USACOE) would only permit the least environmentally damaging practicable alternative.
- **Operational Considerations:** Alternatives that clearly reduced the safe and efficient use of navigable airspace in the U.S. or would derogate the safety of aircraft and airport operations at DVO as compared to existing conditions were not retained for detailed consideration.
- **Cost Considerations:** Alternatives with costs substantially greater than the Sponsor's Proposed Project were considered impracticable.

- **Reasonable, Possible and Prudent Alternative Considerations:** Reasonable alternatives are those that are feasible and prudent from a technical and economic standpoint and using common sense. 49 USC § 47106 (c)(1)(B) and FAA Order 5050.4B, paragraph 1007 (e)(4) state that the Secretary of Transportation may approve a project Grant-in-Aid application for a project involving a new airport, a new runway, or a major runway extension, having significant adverse effects. However, the Secretary may do so only after finding that no possible or prudent alternative that meets the Purpose and Need exists and making a finding that all possible planning to minimize harm has been taken. An alternative is considered "possible" (i.e. "feasible") if, as a matter of sound engineering principles, it can be built. The term prudent refers to rational judgment. FAA Order 5050.4B, paragraph 1007 (e)(5) provides the following factors for the FAA to use to decide if an alternative is prudent:

  1. Does it meet the project's purpose and need?
  2. Does it cause extraordinary safety or operational problems?
  3. Are there unique problems or truly unusual factors present with the alternative?
  4. Does it cause unacceptable and severe adverse social, economic, or other environmental impacts?
  5. Does it cause extraordinary community disruption?
  6. Does it cause added construction, maintenance, or operational costs of an extraordinary magnitude?
  7. Does it result in an accumulation of factors that collectively, rather than individually, have adverse impacts that present unique problems or reach extraordinary magnitudes?"

These seven factors were considered during the evaluation of the alternatives for this EIS.

The alternatives that the FAA considered in this analysis are grouped into eight categories including the No Action alternative, two off-site, and five on-site alternatives.

NO ACTION ALTERNATIVE

In accordance with the Council on Environmental Quality (CEQ) regulations, a No Action Alternative must be carried forward in the assessment of environmental impacts.[1] The No Action Alternative was included in the evaluation of potential

[1] FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects*, April 28, 2006, Chapter 10, Section 1001. EIS PURPOSE. 40 CFR § 1502.1 states the primary purpose of an EIS is to be an "action-forcing tool" to ensure Federal government programs and actions meet NEPA's goals and policies. The EIS allows the agency to take a "hard look" at the environmental impacts of the No Action, the proposed action, and its reasonable alternatives.

environmental consequences in this EIS, as required by 40 CFR § 1502.14(d). With a No Action Alternative, the airfield would remain as it is today, without an extension to the existing runway and no associated taxiway extension and levee relocations. Although not always reasonable, feasible, prudent, or practicable, the No Action Alternative is a potential alternative under CEQ regulations and provides a basis of comparison for the assessment of future conditions/impacts.

3.3 OFF-SITE ALTERNATIVES

This section evaluates the use of other means of transportation, including the use of other airports, highway, rail, and telecommunications technology to satisfy the purpose and need for this project, as described in Chapter Two, *Purpose and Need*.

3.3.1 USE OF OTHER AIRPORTS

The use of other airports in the region is examined to determine if the relocation of operations to another airport is feasible and if it would postpone, reduce, or eliminate the need for extending the existing runway at DVO.

Airports across the country function as an inter-related system. To coordinate and fund this system, the FAA developed the National Plan of Integrated Airport Systems (NPIAS), a system of 3,344 of the nation's 5,280 aviation facilities that are open to the public. The aviation facilities included in the NPIAS are significant to the national aerospace system and eligible to receive Federal funding. One of the guiding principles of the NPIAS is that: "The airport system should be extensive, providing as many people as possible with convenient access to air transportation, typically by having most commuters with no more than 20 miles of travel to the nearest NPIAS airport."[2] This is particularly true for general aviation airports, which tend to serve the communities immediately adjacent to the airport.

DVO is a NPIAS airport and provides general aviation access to the City of Novato, as well as other cities to the south of the Airport (including San Rafael, Larkspur, Corte Madera, and Sausalito) and generally for unincorporated areas of Marin County. There are six other airports serving general aviation activity that are located within a reasonable driving distance of DVO, including Sonoma Valley Airport (0Q3), Petaluma Municipal Airport (O69), Napa County Airport (APC), Half Moon Bay (HAF), Charles M. Schulz-Sonoma County Airport (STS), and San Rafael Airport (CA35). Available runway length is one of the primary ways to evaluate the ability of one of these airports to meet the purpose and need. As discussed in Appendix D, *Runway Length Analysis*, the runway length needed for DVO to meet the purpose of the project is 4,400 feet. Of these regional general aviation facilities, three have runways that are shorter than 4,400 feet (0Q3, O69, and CA35) and three have runways that are longer than 4,400 feet (APC, HAF, and STS).

[2] Federal Aviation Administration, National Plan of Integrated Airport Systems (2007-2013). Accessed online at: http://www.faa.gov/airports_airtraffic/airports/planning_capacity/npias/reports/index.cfm?sect=2007, November 14, 2013.

Table 3-1 summarizes the major facilities and key aviation activity characteristics of each of the aforementioned airports as compared to DVO. The location of each of these airports is shown on **Exhibit 3-1, *General Aviation and Commercial Service Airports Closest to Gnoss Field Airport***.

Each of the Bay Area reliever airports provides runway capacity and landside support facility relief to San Francisco International Airport (SFO) and Oakland International Airport (OAK). As such, these airports reduce airspace congestion and improve the safety of the runway system at both airports (SFO and OAK). Gnoss Field, Petaluma, and Half Moon Bay Airports are designated by the FAA as reliever airports for SFO, while Napa County Airport is a reliever for OAK. Reliever airports can also reduce airspace capacity conflicts with large passenger aircraft that typically serve both SFO and OAK. As major commercial service international airports, SFO and OAK prohibit the full range of general aviation flight activities that designated general aviation airports allow, such as flight training activities. Therefore, the use of SFO and OAK are not alternatives for use of general aviation airports.

3.3.1.1 Sonoma Valley Airport (0Q3)

Sonoma Valley Airport is a privately owned general aviation airport that is open to the public and serves the Sonoma Valley. The airport is located approximately seven nautical miles and 16 driving miles north of DVO. Vehicle access is provided by State Highways SR-37 and SR-121. The airport has two runways; one runway is 2,700 feet in length and the other is 1,500 feet in length. These runway lengths limit the traffic at Sonoma Valley to light aircraft only (i.e., single and multi-engine piston aircraft, almost no turbine activity). The 1997 operations report from Sonoma Valley states that 330 aircraft were based on the field and undertook 11,500 operations. In 2007, there were 16,060 operations and 123 based aircraft.

Given the proximity of Sonoma Valley Airport to DVO and the Novato area, it is possible that pilots who cannot efficiently use DVO could operate from this airport if it had a runway long enough to accommodate their needs. Because the runways at Sonoma Valley Airport are considerably shorter than the runway at DVO, the airport in its current configuration would not meet the need for a runway of 4,400 feet in length. Other factors that reduce the feasibility of this option include airport ownership and site constraints, as well as environmental considerations. The issue of airport ownership is important because Marin County (the Sponsor of this project) does not own or operate Sonoma Valley Airport. Therefore, it is not reasonable to assume that Marin County would invest in infrastructure for the extension of the runway at that airport because it has no authority to implement any improvements at that airport. In addition, FAA and Marin County do not have the authority to divert air transportation activity from DVO to other area airports.

Table 3-1
AIRPORTS SERVING GENERAL AVIATION THAT ARE CLOSEST TO GNOSS FIELD AIRPORT
Gnoss Field Airport

Airport Name		Gnoss Field	Sonoma Valley	Petaluma Municipal	Napa County	Half Moon Bay	Charles M. Schulz - Sonoma County	San Rafael Airport
Airport Code		DVO	0Q3	O69	APC	HAF	STS	CA35
NPIAS Role[2]		Reliever	General Aviation	Reliever	Reliever	Reliever	Commercial Service - Nonhub Primary	GA Private Use
Distance from DVO (in driving miles)		0	16	14	29	49	36	11
Distance from DVO (in nautical miles)		0	7	7	14	38	25	8
Control Tower		NO	NO	NO	YES	NO	YES	NO
Acreage		90	79	220	804	325	1,014	100
Number of Runways		1	2	1	3	1	2	1
Runway Dimensions (Length x Width; in feet)		13-31: 3,300x75	7-25: 2,700x45 17-35: 1,500x50	11-29: 3,600x75	6-24: 5,007x150 18L-36R: 2,510x75 18R-36L: 5,931x150	12-30: 5,000x150	14-32: 5,119x150 2-20: 5,002x100	4-22: 2,140x30
ILS		NO	NO	NO	NO	NO	YES	NO
Hangars/ Buildings		196	43	27	25	50	261	110
Annual Operations[1]	FY 1997	n/a	11,500	50,200	141,922	60,150	134,732	n.a.
	FY 2007	85,058	16,060	53,200	122,623	60,150	132,739	n.a.
Based Aircraft[1]	FY 1997	298	330	203	247	70	413	n.a.
	FY 2007	296	123	203	228	70	415	100

1 Annual operations and based aircraft data was obtained from the FAA TAF for all airports with the exception of Sonoma Valley. Sonoma Valley Airport is not included in the TAF so operations and based aircraft counts were obtained from airnav.com and *Regional Airport System Plan, General Aviation Element, Final Report,* Regional Airport Planning Committee, June 2003.

2 NPIAS Role defined in National Plan of Integrated Airport Systems (NPIAS)

- Commercial service airports are defined as public airports receiving scheduled passenger service and having 2,500 or more enplaned passengers per year.
- Nonhub Primary airports are Commercial Service airports that enplane less than 0.05 percent of all commercial passenger enplanements but have more than 10,000 annual enplanements.
- General Aviation airports do not receive scheduled commercial service or do not meet the criteria for classification as a commercial service airport.
- Reliever airports are high-capacity general aviation airports in major metropolitan areas.

Sources: Landrum & Brown Analysis, FAA Form 5010-1; FAA TAF, airnav.com

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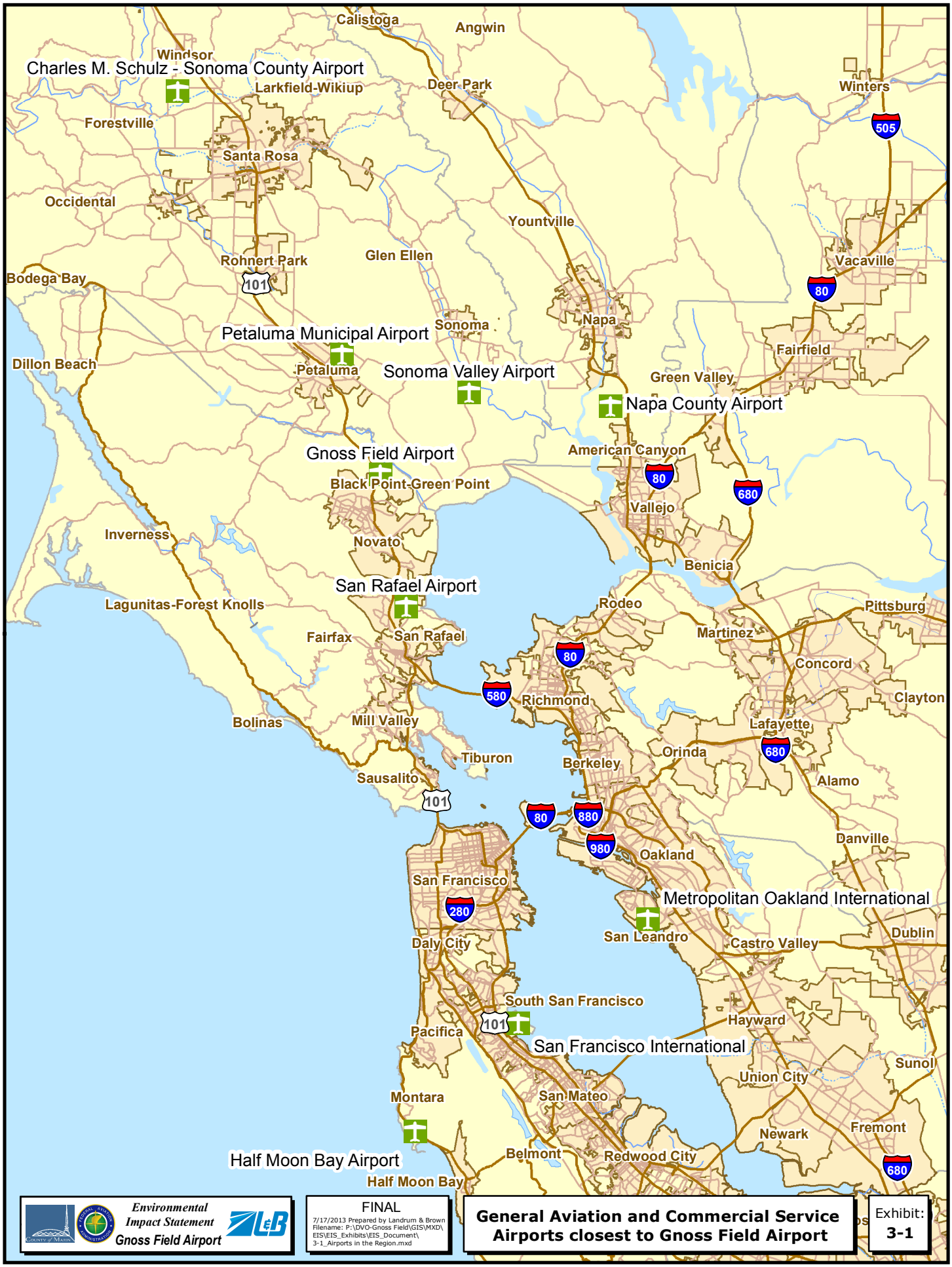


Environmental Impact Statement
Gnoss Field Airport

FINAL

7/17/2013 Prepared by Landrum & Brown
Filename: P:\DVO-Gnoss Field\GIS\MXD\EIS\EIS_Exhibits\EIS_Document\3-1_Airports in the Region.mxd

General Aviation and Commercial Service Airports closest to Gnoss Field Airport

Exhibit: **3-1**

Site constraints due to the proximity of surrounding roadways and active-use of surrounding private property limit this airport's ability to physically expand beyond its current property boundary. Environmental considerations would also need to be addressed. Relocating operations from DVO to Sonoma Valley Airport would result in longer surface vehicle commutes for airport users located south of DVO, which is the primary population area served by DVO. As a result of longer commutes, an increase in surface vehicle air emissions would occur.

The use of Sonoma Valley Airport as an alternative does not meet the purpose to allow existing aircraft, as represented by the critical aircraft at DVO, to operate at Maximum Gross Take Off Weight under hot weather and other adverse weather conditions, because the longest existing runway is shorter than 4,400 feet. Furthermore, it is not reasonable to assume that Sonoma Valley Airport would be expanded to offer a longer runway based on the airport ownership issues and site constraints. In addition, the airport is located in close proximity to sloughs and wetland areas to the west/southwest, which limit its ability to expand beyond the current property boundary. Finally, environmental considerations, such as increased surface vehicle air emissions, would result from the use of Sonoma Valley Airport. Based on this information, using Sonoma Valley Airport to address the needs of DVO is not a reasonable, feasible, prudent, or practicable alternative to the Sponsor's Proposed Project and will not be carried forward for more detailed environmental analysis in this EIS.

3.3.1.2 Petaluma Municipal Airport (O69)

Petaluma Municipal Airport, classified as a reliever airport, is owned by the City of Petaluma and primarily serves the residents of Petaluma. This airport is located approximately 7 nautical miles and 14 driving miles north of DVO. Vehicle access is provided by Highway 101. Petaluma Municipal Airport has one runway that is 3,600 feet in length and 75 feet in width. Like DVO, the Airport's runway length limits the type of aircraft that are able to use the airport to mainly piston engine aircraft and a few turbine aircraft operations. In 2007, the airport reported 53,200 operations and 203 based aircraft.

Given the proximity of Petaluma Municipal Airport to DVO and the Novato Area, it is possible that pilots who cannot efficiently use DVO could operate from this airport if it had a runway long enough to accommodate their needs. While Petaluma Municipal Airport does have a longer runway than DVO, it falls short of the needed length of 4,400 feet. Further, the current Airport Layout Plan (ALP) on file with FAA does not indicate a proposed long term runway extension at Petaluma Municipal Airport. Marin County (the Sponsor of this project) does not own or operate Petaluma Municipal Airport. Therefore, it is not reasonable to assume that Marin County would invest in infrastructure for the extension of the runway at that airport because it has no authority to implement any improvements at that airport. In addition, FAA and Marin County do not have the authority to divert air transportation activity from DVO to other area airports.

Relocating operations from DVO to Petaluma Municipal Airport would result in longer surface vehicle commutes for airport users located south of DVO, which is

the primary population area served by DVO. As a result of longer commutes, an increase in surface vehicle air emissions would occur.

The use of Petaluma Municipal Airport as an alternative does not meet the purpose to allow existing aircraft, as represented by the critical aircraft at DVO, to operate at Maximum Gross Take Off Weight under hot weather and other adverse weather conditions. Furthermore, it is not reasonable to assume that Petaluma Municipal Airport would be expanded to offer a longer runway as their current ALP on file with FAA does not indicate a proposed long term runway extension. Finally, environmental considerations such as increased surface vehicle air emissions would result from the use of Petaluma Municipal Airport. Based on this information, using Petaluma Municipal Airport to address the needs of DVO is not a reasonable, feasible, prudent, or practicable alternative to the Sponsor's Proposed Project and will not be carried forward for more detailed environmental analysis in this EIS.

3.3.1.3 Napa County Airport (APC)

Napa County Airport is located 14 nautical miles and 29 driving miles east of DVO. APC is designated as a reliever airport by the FAA. It is owned by Napa County. Vehicle access is provided by State Highways SR-37 and SR-29. The airport has three runways measuring 5,007 feet, 2,510 feet, and 5,931 feet in length. Unlike DVO or the other airports mentioned thus far, these runway lengths allow APC to accommodate a significant amount of general aviation turbine aircraft operations without restrictions. APC is also the closest airport that is served by an FAA Airport Traffic Control Tower (ATCT), thus enabling the airport to operate at a higher capacity. In 2007, APC reported a total of 122,623 annual operations and had 228 based aircraft.

From an operational standpoint for pilots, given the proximity of Napa County Airport to DVO in nautical miles, it is possible that pilots who cannot efficiently use DVO could operate from this airport for basic needs such as refueling while enroute to another ultimate destination (i.e., not DVO or APC). However, for those travelling specifically to/from Novato, the driving distance to Napa County Airport makes it less likely that this airport would be an efficient alternate destination. Relocating operations from DVO to Napa County Airport would result in longer surface vehicle commutes for airport users located south of DVO, which is the primary population area served by DVO. As a result of longer commutes, an increase in air emissions would occur.

Napa County Airport has two runways with lengths longer than 4,400 feet. However, because of increased drive time and the local demand in the Novato area the use of Napa Airport is not a reasonable alternative to meet the purpose to allow existing aircraft, as represented by the critical aircraft at DVO, to operate at Maximum Gross Take Off Weight under hot weather and other adverse weather conditions. In addition, FAA and Marin County do not have the authority to divert air transportation activity from DVO to other area airports. Finally, environmental considerations such as increased surface vehicle air emissions would result from the use of Napa County Airport. Based on this information, using Napa County Airport

to address the needs of DVO is not a reasonable, feasible, prudent, or practicable alternative to the Sponsor's Proposed Project and will not be carried forward for more detailed environmental analysis in this EIS.

3.3.1.4 Half Moon Bay Airport (HAF)

Half Moon Bay Airport is located 38 nautical miles and 49 driving miles south of DVO. Vehicle access is provided by Highway 101 for travel across the Golden Gate Bridge, and then continuing on Highway 101 or State Highway CA-1 through the City of San Francisco. HAF is owned by San Mateo County and has been designated by FAA as a reliever airport for SFO. HAF has one runway measuring 5,000 feet in length, which allows HAF to accommodate a substantial number of the business jet aircraft. HAF does not have an FAA ATCT. In 2007, HAF reported a total of 60,150 annual operations and had 70 based aircraft.

From an operational standpoint for pilots, given the distance of HAF from DVO in nautical miles, it is possible that pilots who cannot efficiently use DVO could operate from this airport for basic needs such as refueling while enroute to another ultimate destination, although there are other airports with similar services located closer to DVO. Further, for those travelling specifically to/from Novato, the extensive driving distance to HAF makes it is unlikely that this airport would be an efficient alternate destination. Relocating operations from DVO to HAF would result in longer automobile commutes for most DVO airport users, as HAF is located substantially south of DVO. As a result of longer commutes, an increase in surface vehicle air emissions would occur.

Half Moon Bay Airport has one runway with a length longer than 4,400 feet. However, because of increased drive time and the local demand in the Novato area the use of Half Moon Bay Airport is not a reasonable alternative to meet the purpose to allow existing aircraft, as represented by the critical aircraft at DVO, to operate at Maximum Gross Take Off Weight under hot weather and other adverse weather conditions**.** In addition, FAA and Marin County do not have the authority to divert air transportation activity from DVO to other area airports. Finally, environmental considerations such as increased surface vehicle air emissions would result from the use of Half Moon Bay Airport. Based on this information, using Half Moon Bay Airport to address the needs of DVO is not a reasonable, feasible, prudent, or practicable alternative to the Sponsor's Proposed Project and will not be carried forward for more detailed environmental analysis in this EIS.

3.3.1.5 Charles M. Schulz–Sonoma County Airport (STS)

Charles M. Schulz-Sonoma County Airport is located 25 nautical miles and 36 driving miles northwest of DVO. Vehicle access is provided by Highway 101. The airport is a non-hub primary commercial service airport that accommodates both general aviation and commercial service aircraft operations. STS has two runways measuring 5,119 feet and 5,002 feet in length.[3] As a result, STS has

[3] Sonoma County completed a Final Environmental Assessment in August 2013, to extend both runways; one to 6,000 feet long and the other to 5,202 feet long in order to meet FAA Airport

sufficient runway length to accommodate most general aviation turbine aircraft without restrictions. STS has an FAA ATCT. This airport served 132,739 operations in 2007 and had 415 based aircraft.

From an operational standpoint for pilots, given the distance of STS from DVO in nautical miles, it is possible that pilots who cannot efficiently use DVO could operate from this airport for basic needs such as refueling while enroute to another ultimate destination, although there are other airports with similar services located closer to DVO. Further, for those traveling specifically to/from Novato, the extensive driving distance to STS makes it is less likely that this airport would be an efficient alternate destination. Relocating operations from DVO to STS would result in longer surface vehicle commutes for people located south of DVO, which is the primary population area served by DVO. As a result of longer commutes, an increase in surface vehicle air emissions would occur.

Charles M. Schulz-Sonoma County Airport has two runways with lengths longer than 4,400 feet. However, because of increased drive time and the local demand in the Novato area, the use of Charles M. Schulz–Sonoma County Airport is not a reasonable alternative to meet the purpose to allow existing aircraft, as represented by the critical aircraft at DVO, to operate at Maximum Gross Take Off Weight under hot weather and other adverse weather conditions. In addition, FAA and Marin County do not have the authority to divert air transportation activity from DVO to other area airports. Finally, environmental considerations such as increased surface vehicle air emissions would result from the use of STS. Based on this information, using Charles M. Schulz-Sonoma County Airport to address the needs of DVO is not a reasonable, feasible, prudent, or practicable alternative to the Sponsor's Proposed Project and will not be carried forward for more detailed environmental analysis.

3.3.1.6 San Rafael Airport (CA35)

San Rafael Airport is a privately owned - private use airport with a 2,140 foot long by 30-foot wide runway. This airport is not open for public use. The existing runway length at CA35 makes it unable to accommodate most of the twin engine aircraft that currently operate at DVO. There are 100 aircraft based on the field, all of which are single engine piston aircraft. The airport is located eight nautical miles south of DVO.

Given the proximity of San Rafael Airport to DVO and the Novato Area, it is possible that pilots who cannot efficiently use DVO could operate from this airport if it had a runway long enough to accommodate their needs. Currently it falls short of the need of 4,400 feet. Further, CA35 is a private airport and therefore is not required to provide access to the public as does DVO. Neither the FAA nor Marin County have the authority to divert air transportation activity from DVO to other area airports.

Design Standards for RSA and to decouple the overlapping runway ends as recommended by the FAA's Runway Safety Action Team.

The use of San Rafael Airport as an alternative does not meet the purpose to allow existing aircraft, as represented by the critical aircraft at DVO, to operate at Maximum Gross Take Off Weight under hot weather and other adverse weather conditions. Based on this information, using San Rafael Airport to address the needs of DVO is not a reasonable, feasible, prudent, or practicable alternative to the Sponsor's Proposed Project and will not be carried forward for more detailed environmental analysis in this EIS.

3.3.2 OTHER MODES OF TRANSPORTATION AND/OR TELECOMMUNICATIONS

Other modes of transportation or communication that were considered as alternatives to the Sponsor's Proposed Project include highway travel, conventional and high-speed rail travel, and telecommunications. These modes or alternatives to transportation were considered for their potential to meet the purpose and need of the proposed runway extension at DVO.

3.3.2.1 Highway

People choose to use DVO for three primary purposes – flight training, recreation, and business travel. In terms of an alternative to using DVO, the first two uses (flight training and recreation) include air travel as an inherent part of the activity. Flight training is most effectively conducted by participating in a flight school and practicing takeoffs and landings. Recreational flyers enjoy flying as an activity and choose to spend time sightseeing from the air or visiting other airports. Neither of these uses can be replaced by driving.

Business travel can potentially be accomplished through driving, although there are general limits to how far people will drive for business due to the value of their time. When looking at commercial air travel, most business travelers will choose air travel when the driving distance is between 250 and 500 miles. Beyond 500 miles (or roughly one 10-hour day of driving), business travelers will almost always choose air travel over driving. The general threshold for driving time becomes even smaller when you start to consider business travelers that have the resources to charter private aircraft, which is done at DVO. These travelers choose DVO over Oakland International and San Francisco International airports primarily because of the ability to maximize their time due to the on-demand nature of this service. Given this, it is reasonable to assume that the distance DVO business travelers are willing to drive is less than the typical business traveler using commercial airlines.

The highway alternative does not meet the purpose at DVO to allow existing aircraft, as represented by the critical aircraft at DVO, to operate at Maximum Gross Take Off Weight under hot weather and other adverse weather conditions, or the need to address insufficient runway length at DVO. Therefore, the use of a highway as a means to address the needs at DVO is not a reasonable, prudent, or practicable alternative to the Sponsor's Proposed Project and will not be carried forward for more detailed environmental analysis.

3.3.2.2 Conventional and High-Speed Rail

The use of rail as an alternative to air travel is examined below.

CONVENTIONAL RAIL

Amtrak

Amtrak provides conventional rail travel in the U.S. A review of Amtrak service finds that Amtrak does not provide service to/from Marin County.[4] The closest Amtrak stations are located in Oakland and Martinez, California, which are 35 miles and 40 miles from Novato, respectively. The lack of passenger rail service in Marin County makes Amtrak service an unacceptable alternative to business air transport to/from DVO.

Sonoma Marin Area Rail Transit Project

The Sonoma-Marin Area Rail Transit District (SMART) project includes development of a 70-mile-long passenger railroad along the existing Northwestern Pacific Railroad right of way through Marin and Sonoma counties. The rail line will run from Cloverdale, at the north end of Sonoma County, to Larkspur, where the Golden Gate Ferry connects Marin County with San Francisco. Stations are to be located at major population and job centers of the North Bay, including San Rafael, Novato, Petaluma, Cotati, Rohnert Park, Santa Rosa, Windsor, and Healdsburg. The project is currently in the building stage, which involves selection of vehicles, station construction, and final engineering work. The estimated project cost is $690 million, the majority of which would be funded by a voter-approved one-quarter percent sales tax increase. Since that vote, the economic downturn has reduced SMART's projected revenues by several hundred million dollars over the 20-year life of the sales tax, leaving the agency short of the money needed to complete the project as originally envisioned. Consequently, SMART's Board of Directors has decided to build in stages. Construction on the Phase 1 Segment, 37 miles from downtown San Rafael with Railroad Square in Santa Rosa, began in 2012 and will connect the two largest cities in the North Bay and all of the cities in between. Passenger train service is scheduled to begin in 2016. Future segments, ultimately completing the project from Larkspur to Cloverdale, will be built as additional revenues become available.[5] However, the limits of the rail service to these select locations make it an unacceptable alternative to air transport to/from DVO.

HIGH-SPEED RAIL

The California High Speed Rail Authority is studying the potential for developing high-speed passenger rail service in California. The proposed California high-speed train system encompasses more than 800 route miles and would provide intercity

[4] Amtrak, on-line at: http://www.amtrak.com/ Retrieved October 8, 2013.
[5] *Sonoma Marin Area Rail Transit Project*, On-line at: www.sonomamarintrain.org Retrieved November 14, 2013.

travel in California between the major metropolitan centers of Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. The proposed high-speed train would be capable of operating speeds up to 220 miles per hour (mph) and designed for an ultimate speed of 250 mph on a fully grade-separated alignment with an expected trip time from San Francisco to Los Angeles of two hours and forty minutes, or less. Interface with commercial airports, mass transit, and the highway network would be provided as part of the system. A Final Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Proposed California High-Speed Train System was completed in August 2005 and a Final Bay Area to Central Valley High-Speed Train (HST) Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) was completed in May 2008. Preliminary design is currently underway. The project would be built in phases with completion anticipated in 2028.[6]

Ridership forecasts for the California HST Project estimate 88–117 million passengers annually by 2030 for the entire 800-mile high-speed train network. Of the 33 million air trips forecast to be made in the year 2030, it is forecast that approximately 12 million would be attracted to high-speed trains, bringing the level of air traffic in California back to the levels of 2000, slightly higher than it is today. In other words, it is estimated that most of the growth in air traffic would be diverted, leaving airport capacity for international and out-of-state flights. Of the 911 million auto travelers forecast in 2030 to make vehicle trips between the points to be served by the high-speed rail, approximately 6 percent or 50 million would be attracted to high-speed trains. Within the regions that have several stations (Los Angeles Basin, the San Francisco Bay Area, and San Diego County), it is forecast that another 25 million auto trips, less than one percent of the local urban area auto travel, would be eliminated in favor of the use of high-speed rail.[7]

The current plans for this high-speed rail line do not include a direct connection to Marin County. Therefore, business travelers that currently use DVO to fly to California destinations that would be served by this rail line would have to drive into San Francisco to board the train. As discussed above for driving, the DVO business traveler values time and the ability to access specific locations quickly. The likelihood of the California high-speed rail reducing the demand at DVO in any meaningful way is unlikely given that it would take additional time to drive to the station and the destinations are relatively limited.

The use of high-speed rail service as an alternative does not meet the purpose to allow existing aircraft, as represented by the critical aircraft at DVO, to operate at Maximum Gross Take Off Weight under hot weather and other adverse weather conditions, or the need to address insufficient runway length that precludes the critical aircraft from operating at maximum gross take-off weight under adverse weather conditions. Nor would the availability of a local transit rail system, and a

[6] California High Speed Rail 2012 Business Plan , on-line at http://www.cahighspeedrail.ca.gov/Business_Plan_reports.aspx accessed November 13, 2013

[7] California High Speed Rail Authority, on-line at: http://www.cahighspeedrail.ca.gov/ Retrieved November 13, 2013.

state high-speed rail system, be expected to meet the needs of DVO users. The local transit system is designed to compete with vehicle use on local highways during peak commute and shopping periods. The local rail system would not provide service to typical DVO aircraft destinations. The same is true of the high-speed rail system. The high-speed rail system is designed to link major cities in California, and is not expected to provide service to typical DVO aircraft destinations. While high-speed rail is planned for the San Francisco Bay Area at some point in the near future, it is not a prudent, reasonable, feasible, or practicable alternative to the Sponsor's Proposed Project and will not be carried forward for more detailed environmental analysis.

3.3.2.3 Telecommunications

The potential for telecommunications to affect the need for business travel has been studied since two-way video-conferencing technology became available on the commercial market in the 1980s. Constantly emerging technology continues to improve the availability, affordability, reliability, and speed of voice and data communication. Continued technological advances and the widespread installation of fiber optics and other communications technology will continue to make telecommunication alternatives more widely available.

A survey completed in 2003 by American Express polled 800 business travelers from eight countries including the U.S. Findings of this survey indicate:

> *…travelers value business travel as a tool to maintain and develop customer relationships: asked if business travel is essential to growing a business, more the 89% of the respondents agreed, either strongly or slightly. A majority of respondents from each country agreed on some level...*
>
> *The American Express survey also shows that some business travelers use Web meetings and teleconferencing in place of travel, but the majority clearly considers in-person meetings with clients or business associates superior. More than 35% say that this year (2003), they have used such technology (virtual meeting) – either frequently or occasionally – instead of traveling. However, a combined 65 percent say they do not do virtual meetings very much or at all.*
>
> *Asked if teleconferencing or web facilities offer an adequate substitute to face-to-face meetings, nearly two thirds-(65%) said no, while 35 percent differed. …Even among those who gave equal consideration to virtual meetings and in-person meetings, 75 percent said that telecommunication is only appropriate for conferring for an hour or less.*[8]

Evidence indicates that the use of telecommunications and video-conferencing may be increasing to satisfy business needs, but there is no indication that it would satisfy all business needs and thereby reduce the need for travel. It may complement or supplement travel, but is not seen as a substitute by a majority of

[8] The Practice, *International Business Travelers Sacrificing Comfort For Low Prices, American Express Survey Shows,* August 2003, http://home3.americanexpress.com/corp/pc/2003/sacrificing_comfort.asp Retrieved September 20, 2006.

the public for business travel. In addition, the impact of improvements in the communication field would have little or no effect on flight training and recreational flyers.

This alternative does not meet the purpose to allow existing aircraft, as represented by the critical aircraft at DVO, to operate at Maximum Gross Take Off Weight under hot weather and other adverse weather conditions, or the need to address insufficient runway length that precludes the critical aircraft from operating at maximum gross take-off weight under adverse weather conditions. While communication technology may reduce the demand for air travel by a small amount, it would not replace the need for air travel. Therefore, telecommunication technology is not a prudent, reasonable, feasible, or practicable alternative to the Sponsor's Proposed Project and will not be carried forward for more detailed environmental analysis.

Based on the analysis presented above, the use of other modes of transportation will not meet the purpose to allow existing aircraft, as represented by the critical aircraft at DVO, to operate at Maximum Gross Take Off Weight under hot weather and other adverse weather conditions.

3.4 ON-SITE ALTERNATIVES

3.4.1 RUNWAY DEVELOPMENT ALTERNATIVES AND SCREENING RESULTS

Four runway development alternatives were initially identified for evaluation (plus the No Action Alternative). These alternatives were further screened to determine if they could substantially meet the purpose to allow existing aircraft, as represented by the critical aircraft at DVO, to operate at Maximum Gross Take Off Weight under hot weather and other adverse weather conditions, and the need to address insufficient runway length at DVO. The analysis of runway length identified that 4,400 feet was the minimum length to accommodate the critical aircraft (see Appendix D for more information). Therefore, alternatives that included shorter runway lengths were considered but not retained for detailed review because they did not meet the purpose and need for the project. The purpose and need statements are discussed in detail in Chapter Two, *Purpose and Need*.

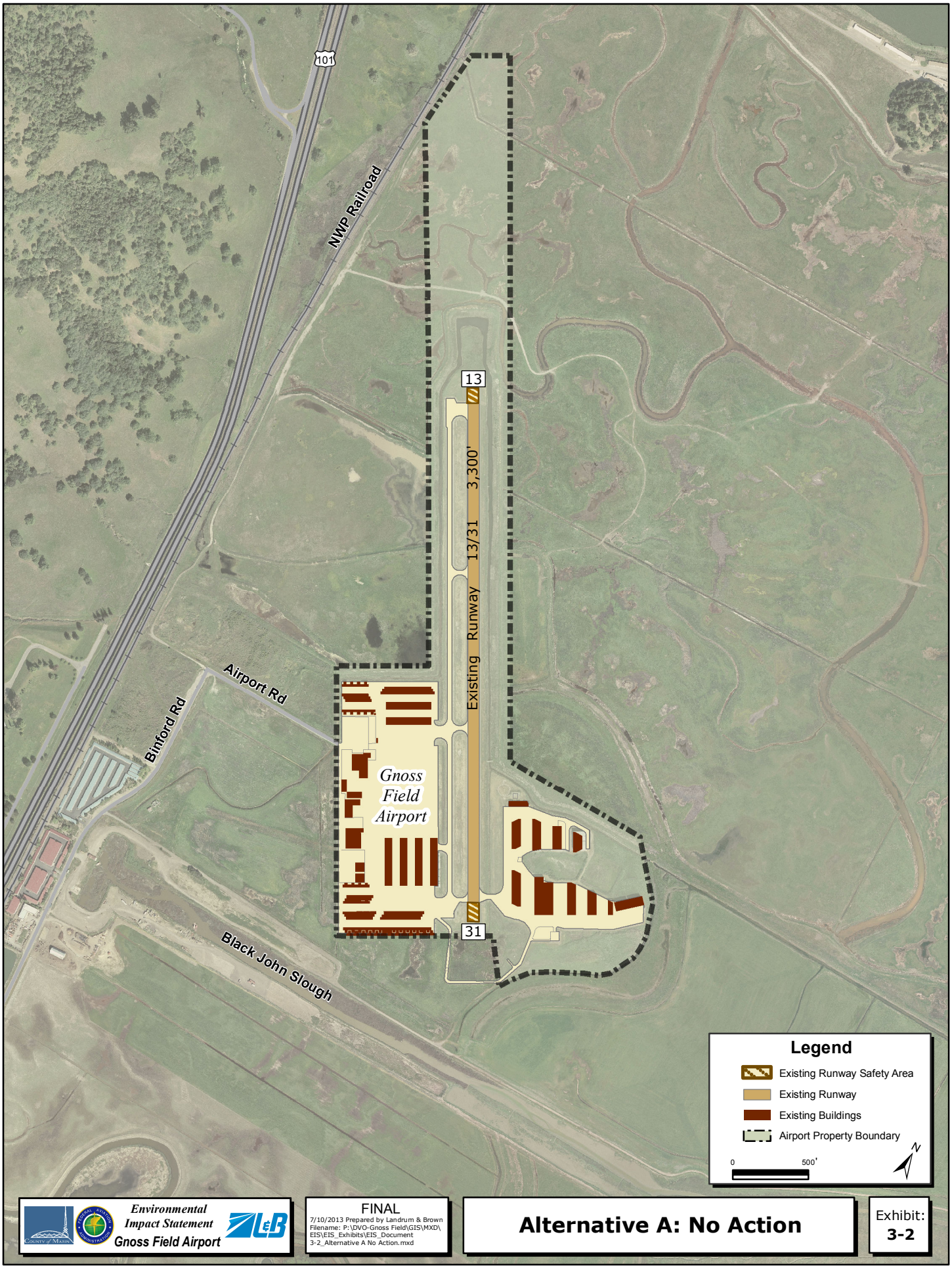
The runway development alternatives presented below all meet the purpose and need for the project. As such, the second screening for the additional considerations (significant operational and environmental drawbacks, and cost) was performed. DVO would remain open during construction under any development alternative and any operational modifications during construction would be address in a Construction Safety and Phasing Plan.

The runway development alternatives, along with the screening results of each are included in the following sections.

3.4.1.1 Alternative A: No Action

Alternative A (No Action), is identified as the No Action Alternative in this EIS. This alternative assumes that Runway 13/31 would be maintained at its current length and no associated taxiway extension, Runway Safety Area (RSA) extension, realignment of drainage channels, extension of levees, or reprogramming of navigational aids would occur. **Exhibit 3-2*, Alternative A: No Action***, presents a graphic depiction of Alternative A. Preliminary evaluation of Alternative A is as follows:

- Environmental: Would not result in physical environmental impacts (wetlands or cultural resources).
- Operational: Would continue the use of non-standard RSA and would not address the need for more runway length to accommodate current aircraft operators.
- Cost: No direct costs, but indirect costs would occur as a result of not meeting FAA standards and not providing the runway length to accommodate the current aircraft. Indirect costs include the loss of revenue to the Airport due to the fact that some pilots would choose not to use DVO, therefore depriving the County of revenues associated with the sale of fuel to these aircraft.
- Reasonable, Possible and Prudent Alternative Considerations**:**
  1. Does it meet the project's purpose and need? ***No***.
  2. Does it cause extraordinary safety or operational problems? ***No***.
  3. Are there unique problems or truly unusual factors present with the alternative? ***No***.
  4. Does it cause unacceptable and severe adverse social, economic, or other environmental impacts? ***No***.
  5. Does it cause extraordinary community disruption? ***No***.
  6. Does it cause added construction, maintenance, or operational costs of an extraordinary magnitude? ***No***.
  7. Does it result in an accumulation of factors that collectively, rather than individually, have adverse impacts that present unique problems or reach extraordinary magnitudes? ***No***.
- Determination: This alternative does not meet the purpose and need for the project. The No Action Alternative was included in the evaluation of potential environmental consequences in this EIS, as required by 40 CFR § 1502.14(d).



Environmental Impact Statement
Gnoss Field Airport

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Alternative A: No Action

Exhibit: 3-2

3.4.1.2 Alternative B: Extend Runway to the Northwest by 1,100 Feet (Sponsor's Proposed Project)

Alternative B (Sponsor's Proposed Project), includes an extension of Runway 13/31 to the northwest by 1,100 feet for a total runway length of 4,400 feet at the existing runway width of 75 feet. In addition, this alternative would include extension of the parallel taxiway to match the length of the runway; extension of the existing FAA standard 120-foot wide RSA centered on the runway centerline to match the length of the runway; inclusion of FAA standard 240-foot RSA at each end of the runway in addition to the 1,100 foot runway extension; corresponding realignment of drainage channels to drain the extended runway, taxiway and RSA; corresponding levee extension to protect the extended runway, taxiway, and RSA from flooding; and relocation of the navigational aids that pilots use for approach to landing at the Airport to reflect the extended runway. **Exhibit 3-3*, Alternative B: Sponsor's Proposed Project***, presents a graphic depiction of Alternative B. Preliminary evaluation of Alternative B is as follows:

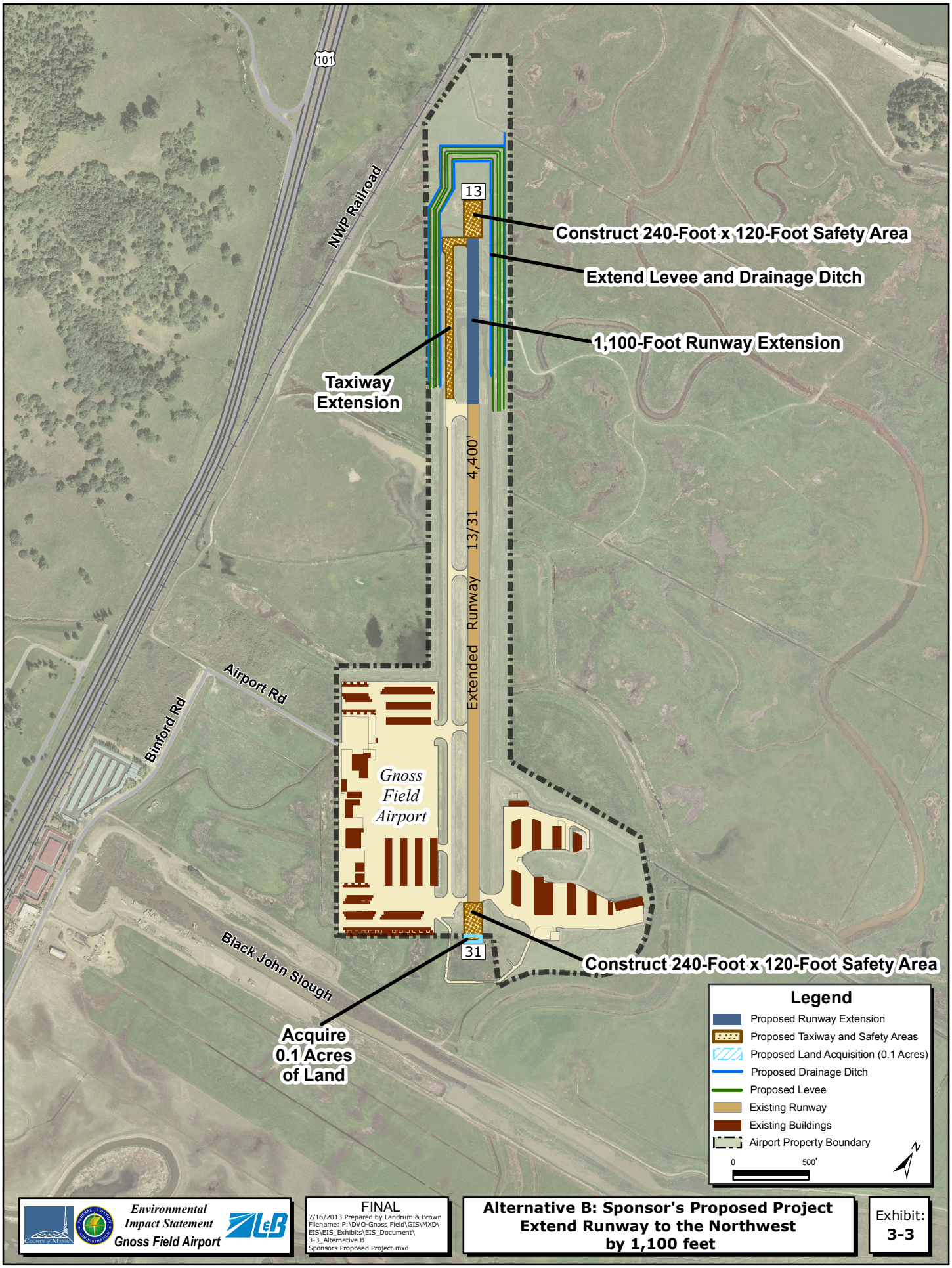
- Environmental:
  - Would require the relocation of the levee and drainage ditch around the runway.
  - The area where the runway extension and northern RSA would be located is almost entirely wetlands that would require filling.
  - There are potential cultural resources and habitat impacts due to the alternative.
  - Would result in aircraft shifting where the climb to altitude would occur when departing to the south. Aircraft would be at a higher altitude than is currently experienced with the existing runway before passing near the residential areas to the south of the Airport, which would potentially decrease aircraft departure noise levels in those communities.
- Operational:
  - The runway would be extended closer to the landfill northeast of the Airport, which is a potential bird-attractant. This alternative could be inconsistent with FAA bird-aircraft strike hazard minimization guidance.
    - Would require relocation of the Precision Approach Path Indicator (PAPI) and Visual Approach Slope Indicator (VASI) navigational aids that pilots use for approach to landing at the Airport to reflect the extended runway.
  - Would address the need for additional runway length.
- Cost:
  - Acquisition costs for the County to gain exclusive use of 0.1 acres of land to the south of the Airport that would be required for the associated RSA extension.

- Reasonable, Possible and Prudent Alternative Considerations:
  1. Does it meet the project's purpose and need? ***Yes***.
  2. Does it cause extraordinary safety or operational problems? ***No***.
  3. Are there unique problems or truly unusual factors present with the alternative? ***No***.
  4. Does it cause unacceptable and severe adverse social, economic, or other environmental impacts? ***No***.
  5. Does it cause extraordinary community disruption? ***No***.
  6. Does it cause added construction, maintenance, or operational costs of an extraordinary magnitude? ***No***.
  7. Does it result in an accumulation of factors that collectively, rather than individually, have adverse impacts that present unique problems or reach extraordinary magnitudes? ***No***.
- Determination: This alternative meets the need for the project and is the Sponsor's Proposed Project. Therefore, this alternative will be carried forward for detailed analysis.

3.4.1.3 Alternative C: Extend Runway to the Southeast by 1,100 Feet

Alternative C includes an extension of Runway 13/31 to the southeast by 1,100 feet for a total runway length of 4,400 feet at the existing runway width of 75 feet. In addition, this alternative would include extension of the parallel taxiway to match the length of the runway; extension of the existing FAA standard 120-foot wide RSA centered on the runway centerline to match the length of the runway; inclusion of FAA standard 240-foot RSA at each end of the runway in addition to the 1,100 foot runway extension; corresponding realignment of drainage channels to drain the extended runway and taxiway; corresponding levee extension to protect the extended runway and taxiway from flooding; corresponding relocation of the access road south of the runway, which extends from the west side to the east side of the Airport, to keep the access road outside of the RSA; and relocation of the navigational aids that pilots use to land at the Airport to reflect the extended runway. **Exhibit 3-4*, Alternative C: Extend Runway to the Southeast by 1,100 Feet***, presents a graphic depiction of Alternative C. Preliminary evaluation of Alternative C is as follows:

- Environmental:
  - Would result in extensive impacts to the water resources to the south of the Airport (Black John Slough) and wetlands. Also to consider is the fact that, relative to the *Clean Water Act* Section 404 (b)(1) guidelines, the USACOE would only permit the least damaging practicable alternative.
  - There are potential cultural resources and habitat impacts due to the alternative.
  - Would move the runway closer to protected wildlife areas to the southeast of the Airport.



Environmental Impact Statement
Gnoss Field Airport

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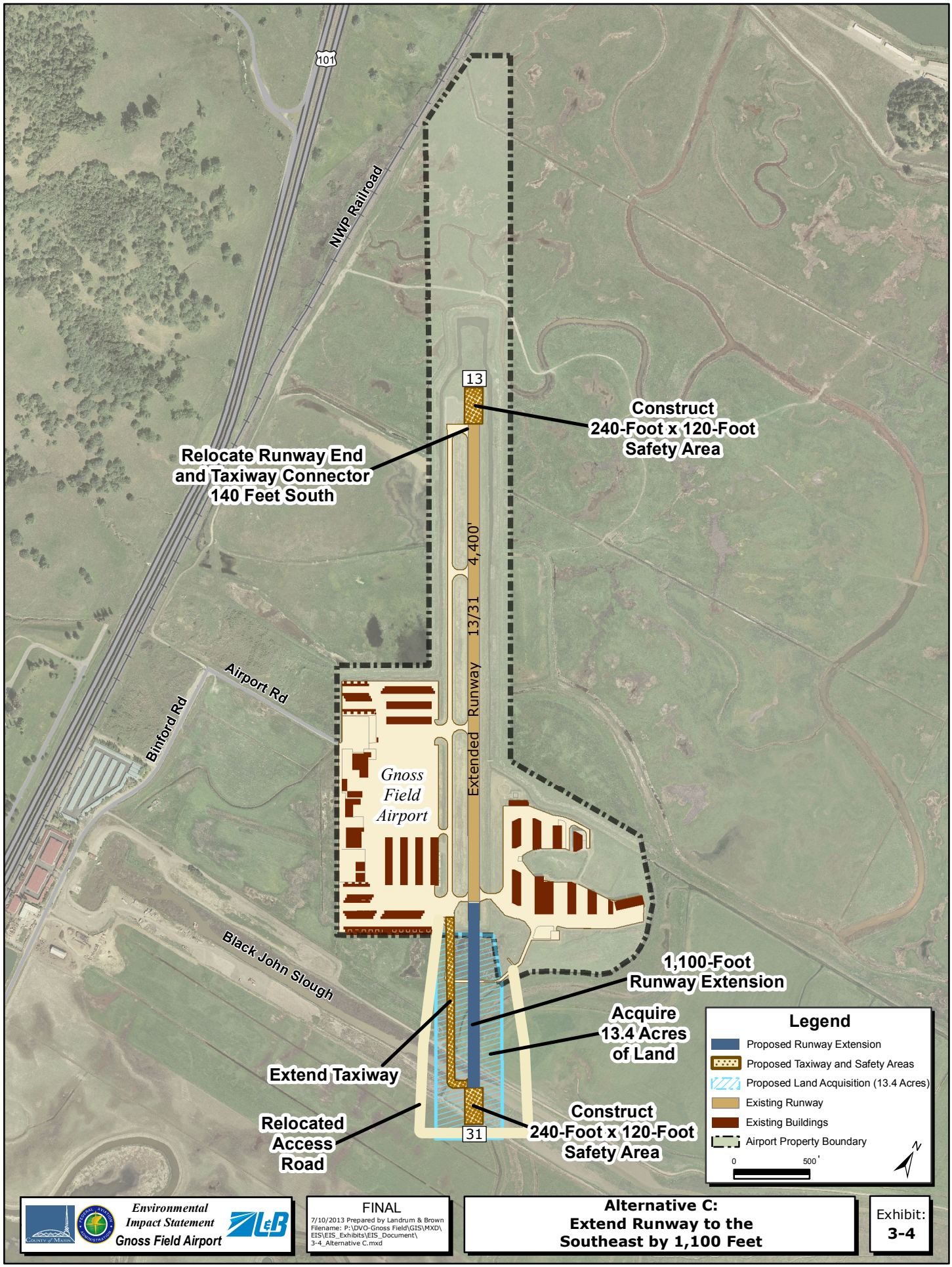
Alternative B: Sponsor's Proposed Project
Extend Runway to the Northwest by 1,100 feet

Exhibit: **3-3**


101
NWP Railroad
13
Construct
240-Foot x 120-Foot
Safety Area
Relocate Runway End
and Taxiway Connector
140 Feet South
4,400'
13/31
Runway
Extended
Airport Rd
Binford Rd
Gnoss
Field
Airport
Black John Slough
1,100-Foot
Runway Extension
Acquire
13.4 Acres
of Land
Extend Taxiway
Relocated
Access
Road
31
Construct
240-Foot x 120-Foot
Safety Area
Legend
Proposed Runway Extension
Proposed Taxiway and Safety Areas
Proposed Land Acquisition (13.4 Acres)
Existing Runway
Existing Buildings
Airport Property Boundary
0
500'
Environmental
Impact Statement
Gnoss Field Airport
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7/10/2013 Prepared by Landrum & Brown
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3-4_Alternative C.mxd
Alternative C:
Extend Runway to the
Southeast by 1,100 Feet
Exhibit:
3-4

- Because the landing threshold for Runway 13 would be closer to the residential areas to the south of the Airport, aircraft approaching to land at DVO from the south would be at a lower altitude on approach than is experienced with the existing runway when passing near the residential areas to the south of the Airport; this could potentially increase aircraft approach noise levels in those communities.

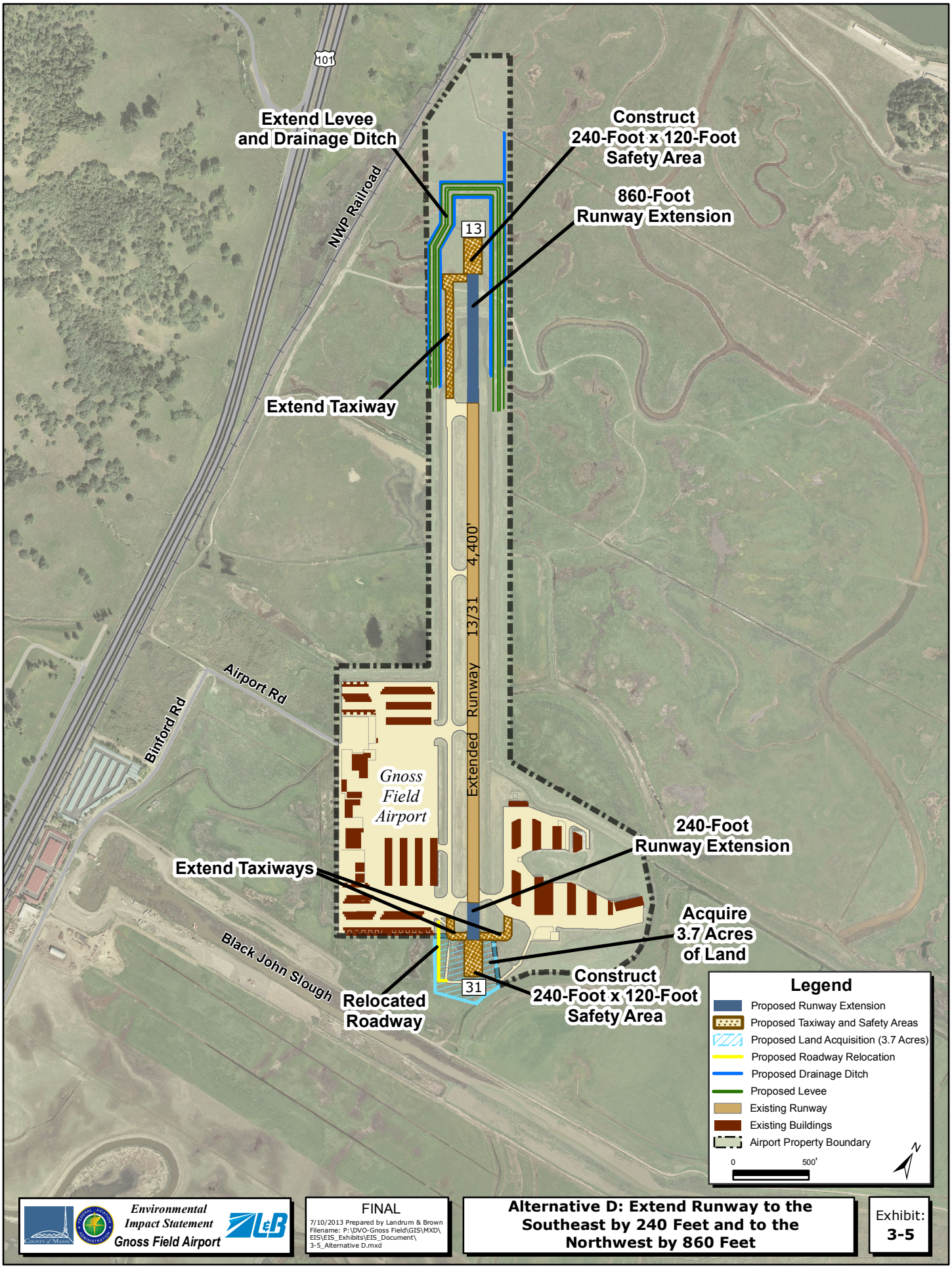
- Operational:
  - Would result in the runway being located more centrally to the aircraft hangars.
  - Would address both the non-standard RSA and the need for additional runway length.
  - The PAPI and VASI navigational aids, which provide visual approach guidance for aircraft landing at the Airport, would be relocated with the extended runway closer to the residential areas to the south of the Airport. This would require a steeper angle of approach than is experienced with the existing runway threshold, which is already set at 4.0 degrees (3.0 degrees is the standard). If the approach angle is steepened, aircraft could potentially approach at faster speeds, particularly when crosswinds are present. This condition exacerbates the need for additional runway length by potentially needing more than 4,400 feet.
- Cost:
  - Would be the most expensive alternative due to the need to acquire approximately 13 acres of land (currently privately owned) and additional environmental mitigation costs.
- Reasonable, Possible and Prudent Alternative Considerations:
  1. Does it meet the project's purpose and need? ***Yes***.
  2. Does it cause extraordinary safety or operational problems? ***No***.
  3. Are there unique problems or truly unusual factors present with the alternative? ***No***.
  4. Does it cause unacceptable and severe adverse social, economic, or other environmental impacts? ***Yes***. Wetland impacts are more severe than under other alternatives, and therefore unlikely to receive a Clean Water Act, Section 404 permit as other, less environmentally damaging, practicable alternatives, are available.
  5. Does it cause extraordinary community disruption? ***No***.
  6. Does it cause added construction, maintenance, or operational costs of an extraordinary magnitude? ***No***.
  7. Does it result in an accumulation of factors that collectively, rather than individually, have adverse impacts that present unique problems or reach extraordinary magnitudes? ***Yes***. This alternative is not prudent given that other alternatives are less costly and more protective of the environment.

- Determination: This alternative meets the need of the project. This alternative requires greater amounts of fill of waters and wetlands when compared to Alternative B, including the necessity to fill portions of the waters of Black John Slough. This alternative also requires land acquisition for construction and would require more aquatic mitigation than Alternative B. The Clean Water Act, Section 404, (b)(1) guidelines only allow the USACOE to permit the least environmentally damaging practicable alternative. As the same project purpose can be accomplished by implementation of Alternative B or Alternative D (described below) it is unlikely that the USACOE would issue Marin County a Clean Water Act, Section 404 permit to construct Alternative C, when Alternatives B and D have been identified as practicable. Therefore, this alternative will not be carried forward for detailed analysis.

3.4.1.4 Alternative D: Extend Runway to the Southeast by 240 Feet and To the Northwest by 860 Feet

Alternative D includes an extension of Runway 13/31 to the southeast by 240 feet and to the northwest by 860 feet for a total runway length of 4,400 feet at the existing runway width of 75 feet. In addition, this alternative would include extension of the parallel taxiway to match the length of the runway; extension of the existing FAA standard 120-foot wide RSA centered on the runway centerline to match the length of the runway; inclusion of FAA standard 240-foot RSA at each end of the runway in addition to the 1,100 foot runway extension; corresponding relocation of the south access road from the west to the east of the Airport to maintain separation of ground vehicle traffic from aircraft traffic; corresponding realignment of drainage channels to drain the extended runway and taxiway; corresponding levee extension to protect the extended runway and taxiway from flooding; and relocation of the navigational aids that pilots use to land at the Airport to reflect the extended runway.

Exhibit 3-5*, Alternative D: Extend Runway to the Southeast by 240 Feet and to the Northwest by 860 Feet*, presents a graphic depiction of Alternative D. Several variations of Alternative D were considered that relocated the access road for Alternative D farther south than shown on Exhibit 3-5. These variations were not evaluated in detail because compared to Alternative D, they increased the amount of time required for ground vehicles to traverse the runway protection zone; increased wetland fill and mitigation requirements over Alternative D; and increased costs. Preliminary evaluation of Alternative D is as follows:


Extend Levee and Drainage Ditch
Construct 240-Foot x 120-Foot Safety Area
860-Foot Runway Extension
NWP Railroad
101
13
Extend Taxiway
4,400'
13/31
Extended Runway
Airport Rd
Binford Rd
Gnoss Field Airport
240-Foot Runway Extension
Extend Taxiways
Acquire 3.7 Acres of Land
Black John Slough
Relocated Roadway
31
Construct 240-Foot x 120-Foot Safety Area
Legend
Proposed Runway Extension
Proposed Taxiway and Safety Areas
Proposed Land Acquisition (3.7 Acres)
Proposed Roadway Relocation
Proposed Drainage Ditch
Proposed Levee
Existing Runway
Existing Buildings
Airport Property Boundary
0
500'
Environmental Impact Statement
Gnoss Field Airport
FINAL
7/10/2013 Prepared by Landrum & Brown
Filename: P:\DVO-Gnoss Field\GIS\MXD\EIS\EIS_Exhibits\EIS_Document\3-5_Alternative D.mxd
Alternative D: Extend Runway to the Southeast by 240 Feet and to the Northwest by 860 Feet
Exhibit: 3-5

- Environmental:
  - Would require the relocation of the levee and drainage ditch around the runway.
  - The area where the runway extension would be located is almost entirely wetlands that would require filling.
  - Would require relocation of a portion of the access road between west and east areas of the Airport at the south end of Runway 31.
  - There are potential cultural resources and habitat impacts due to the alternative.
  - Would move the runway closer to protected wildlife areas to the southeast of the Airport.
  - Because the landing threshold for Runway 13 would be closer to the residential areas to the south of the Airport, aircraft approaching to land at DVO from the south, would be at a lower altitude on approach than is experienced with the existing runway when passing near the residential areas to the south of the Airport; this could potentially increase aircraft approach noise levels in those communities.
- Operational:
  - Would move the runway closer to the landfill northeast of the Airport, but not as much as Alternative B.
  - Would address the need for additional runway length.
  - The PAPI and VASI navigational aids, which provide visual approach guidance for aircraft landing at the Airport, would be relocated with the extended runway closer to the residential areas to the south of the Airport. This would require a steeper angle of approach than is experienced with the existing runway threshold, which is already set at 4.0 degrees (3.0 degrees is the standard). If the approach angle is steepened, aircraft could potentially approach at faster speeds, particularly when crosswinds are present. This condition exacerbates the need for additional runway length by potentially needing more than 4,400 feet.
- Cost:
  - Would require additional costs for acquisition of 3.72 acres of land (currently privately owned).
- Reasonable, Possible and Prudent Alternative Considerations:
  1. Does it meet the project's purpose and need? ***Yes***.
  2. Does it cause extraordinary safety or operational problems? ***No***.
  3. Are there unique problems or truly unusual factors present with the alternative? ***No***.
  4. Does it cause unacceptable and severe adverse social, economic, or other environmental impacts? ***No***.

5. Does it cause extraordinary community disruption? ***No***.
6. Does it cause added construction, maintenance, or operational costs of an extraordinary magnitude? ***No***.
7. Does it result in an accumulation of factors that collectively, rather than individually, have adverse impacts that present unique problems or reach extraordinary magnitudes? ***No***.

- Determination: This alternative meets the need of the project and includes similar environmental impacts as the Sponsor's Proposed Project. Therefore, this alternative will be carried forward for detailed analysis.

3.4.2 RUNWAY ALTERNATIVE SCREENING SUMMARY

Based on the analysis presented above and summarized in **Table 3-2**, the following alternatives are carried forward for further evaluation:

1. Alternative A: No Action;
2. Alternative B: Extend Runway to the Northwest by 1,100 Feet (Sponsor's Proposed Project); and
3. Alternative D: Extend Runway to the Southeast by 240 Feet and to the Northwest by 860 Feet.

3.4.3 FAA PREFERRED ALTERNATIVE

Alternative B, extend Runway 13/31 to the north by 1,100 feet, is the FAA's Preferred Alternative. Extending Runway 13/31 to the north by 1,100 feet would meet the Sponsor's purpose and need for the proposed project to allow existing aircraft, as represented by the critical aircraft at DVO, to operate at Maximum Gross Take Off Weight under hot weather and other adverse weather conditions, without derogating the safety of aircraft and airport operations and with fewer adverse environmental impacts than Alternative D.

3.4.4 ENVIRONMENTALLY PREFERRED ALTERNATIVE

Of all alternatives considered, the No Action Alternative has the fewest environmental impacts and is considered the Environmentally Preferable Alternative. However, the No Action Alternative does not meet the project purpose and need. Of the project alternatives that do meet the project purpose and need, Alternative B, extend Runway 13/31 to the north by 1,100 feet, would be the Environmentally Preferred Alternative because it has fewer environmental impacts than Alternative D, extend Runway 13/31 southeast by 240 feet and northwest by 860 feet. Alternative B is the least environmental damaging practicable alternative that meets the purpose and need of the proposed project.

Table 3-2
RUNWAY DEVELOPMENT ALTERNATIVES EVALUATION MATRIX
Gnoss Field Airport

Alternative	Description	Step 1: Does it Meet the Airport's Need to provide sufficient runway length?	Step 2: Additional Considerations			Preliminary Determination
			Environmental	Operational	Cost	
A	No Action	no	• Results in no physical environmental impacts (wetlands or cultural resources)	• Would continue the use of non-standard Runway Safety Areas and would not address the need for more runway length to accommodate current aircraft operators.	• No direct costs. • Indirect costs would occur as a result of not meeting FAA standards and not providing the runway length to accommodate the current aircraft. Indirect costs include the loss of revenue to the Airport due to the fact that some pilots would choose not to use DVO, therefore depriving the County of revenues associated with the sale of fuel to these aircraft.	Alternative does not meet the Purpose and Need for the project. 40 CFR § 1502.14(d) guidelines require a No Action Alternative be included in the evaluation of environmental consequences, therefore this alternative will be carried forward for detailed analysis.
B	Extend Runway to the Northwest by 1,100 Feet (Sponsor's Proposed Project)	yes	• Would require the relocation of the levee and drainage ditch around the northern portion of the runway resulting in the permanent removal of wetland habitat. • Would require the temporary and permanent removal of endangered species habitat. • Although there is no known cultural resources impact from this Alternative, there are potential cultural resource impacts and monitoring would be required. • Would result in aircraft shifting where the climb to altitude would occur when departing to the south. Aircraft would be at a higher altitude than is currently experienced with the existing runway before passing near the residential areas to the south of the Airport, which would potentially decrease aircraft departure noise levels in those communities. • Would require construction in the 100-year floodplain.	• Addresses both the non-standard Runway Safety Area and the need for additional runway length. • The runway would be extended closer to the landfill northeast of the Airport, which is a potential bird-attractant. This alternative could be inconsistent with FAA bird-aircraft strike hazard guidance. • Would require relocation of the PAPI/VASI navigational aids that pilots use for approach to landing at the Airport to reflect the extended runway.	• Acquisition costs for the County to gain exclusive use of 0.1 acres of land to the south of the Airport that would be required for the associated RSA extension.	Alternative meets the need of the project and is the Sponsor's Proposed Project. Therefore this alternative will be carried forward for detailed analysis.
C	Extend Runway to the Southeast by 1,100 Feet	yes	• Would require the extension of the levee and drainage ditch to the south of the existing runway resulting in more extensive permanent removal of wetland habitat than either Alternative B or Alternative D, including a portion of Black John Slough. • Would require more extensive temporary and permanent removal of endangered species habitat than Alternative B or Alternative D. • Although there is no known cultural resources impact from this Alternative, there are potential cultural resource impacts and monitoring would be required. • Because the landing threshold for Runway 13 would be closer to the residential areas to the south of the Airport, aircraft approaching to land at DVO from the south, would be at a lower altitude on approach than is experienced with the existing runway when passing near the residential areas to the south of the Airport; this could potentially increase aircraft noise levels in those communities. • Would require construction in the 100-year floodplain.	• Addresses both the non-standard Runway Safety Area and the need for additional runway length. • Results in the runway being located more centrally to the hangars. • The PAPI and VASI, which provide visual approach guidance for aircraft landing at the Airport, would be relocated with the extended runway closer to the residential areas to the south of the Airport. This would require a steeper angle of approach than is experienced with the existing runway threshold, which is already set at 4.0 degrees (3.0 degrees is the standard). If the approach angle is steepened, aircraft could potentially approach at faster speeds, particularly when crosswinds are present. This condition exacerbates the need for additional runway length by potentially needing more than 4,400 feet.	• Would be the most expensive alternative due to the need to acquire approximately 13 acres of land (currently privately owned) and additional mitigation costs.	Alternative meets the need of the project. However, the additional environmental impacts, associated costs, and the need to purchase large amounts of land are considered impractical. Therefore, this alternative will not be carried forward for detailed analysis.
D	Extend Runway to the Southeast by 240 Feet and to the Northwest by 860 Feet	yes	• Would require the relocation of the levee and drainage ditch around north and south portions of the runway resulting in permanent removal of wetland habitat similar, but slightly larger, than Alternative B. • Would require the temporary and permanent removal of endangered species habitat similar to, but slightly higher than, Alternative B. • Although there is no known cultural resources impact from this Alternative, there are potential cultural resource impacts and monitoring would be required. • Would result in aircraft shifting where the climb to altitude would occur when departing to the south. Aircraft would be at a higher altitude than is currently experienced with the existing runway before passing near the residential areas to the south of the Airport, but not as high as Alternative B, which would potentially decrease aircraft departure noise levels in those communities. • Would require construction in the 100-year floodplain.	• Addresses both the non-standard Runway Safety Area and the need for additional runway length. • The runway would be extended closer to the landfill northeast of the Airport, which is a potential bird-attractant. This alternative could be inconsistent with FAA bird-aircraft strike hazard guidance. • The PAPI and VASI navigational aids, which provide visual approach guidance for aircraft landing at the Airport, would be relocated with the extended runway closer to the residential areas to the south of the Airport. This would require a steeper angle of approach than is experienced with the existing runway threshold, which is already set at 4.0 degrees (3.0 degrees is the standard). If the approach angle is steepened, aircraft could potentially approach at faster speeds, particularly when crosswinds are present. This condition exacerbates the need for additional runway length by potentially needing more than 4,400 feet.	• Would require additional costs for acquisition of 3.72 acres of land (currently privately owned).	Alternative meets the need of the project. Therefore this alternative will be carried forward for detailed analysis.

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CHAPTER FOUR
AFFECTED ENVIRONMENT

The Affected Environment chapter provides a description of the existing environmental conditions[1] in and around the vicinity of Gnoss Field Airport (DVO or Airport). This description of existing conditions describes the area(s) that may be affected by the Sponsor's Proposed Project. It also provides a basis of comparison to determine the environmental consequences of the Sponsor's Proposed Project and remaining alternatives, relative to existing social, economic, and environmental settings. Existing conditions for the following categories listed are described in this chapter, Chapter Four. The remaining categories' existing conditions are described in Chapter Five, *Environmental Consequences*. The affected environment is described in terms of:

- Airport Setting and Location
  - Study Areas
  - Climate and Topography
- Noise
  - Existing Noise Exposure
  - Noise Measurements
- Compatible Land Use
  - Existing Land Use
  - Future Planned Land Use
- Socioeconomic Overview
  - Population Trends
  - Economic Growth and Employment
- Existing Air Quality Conditions
- Water Resources
  - Wetlands and Waters of the U.S.
  - Floodplains
- Public Lands
  - Department of Transportation (DOT) Section 4(f) Resources and Land and Water Conservation Act, Section 6(f) Resources
  - Public Parks and Recreation Facilities
- Historic, Architectural, Archaeological, and Cultural Resources
- Energy Supply and Natural Resources
- Fish, Wildlife, and Plants
  - Threatened and Endangered Species

[1] Conditions measured in 2008 represent existing conditions for these analyses.

4.0 AIRPORT SETTING AND LOCATION

DVO is located in the unincorporated area of Marin County approximately three miles north of the City of Novato on a 120-acre site situated between Highway 101 and the Petaluma River (see **Exhibit 4-1, *Airport Regional Location***). DVO is the only public use, general aviation airport in Marin County, California, and one of several reliever airports in the San Francisco Bay area for San Francisco International Airport (SFO) and Oakland International Airport (OAK).

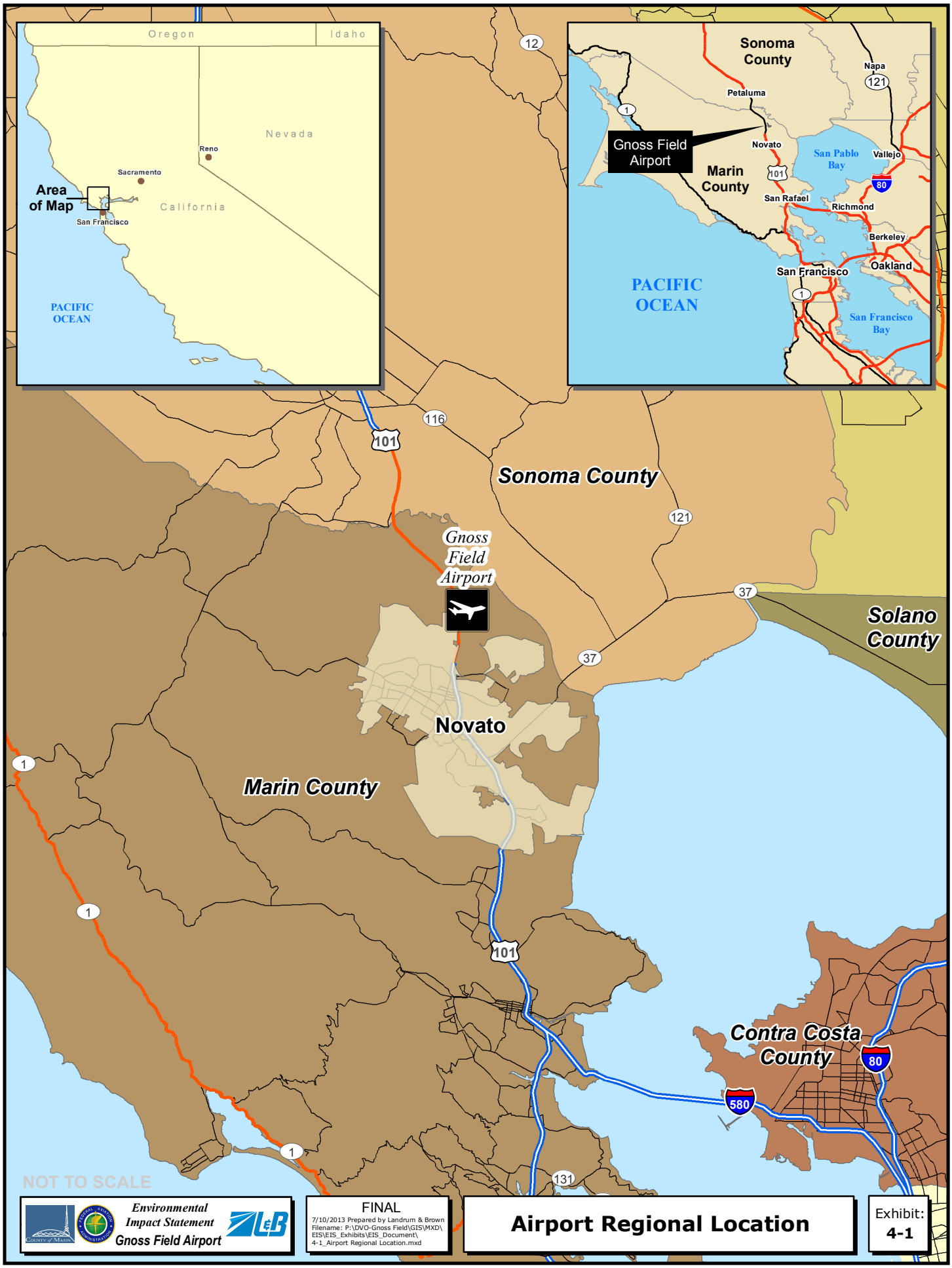
DVO is owned and operated by Marin County, California. The County Department of Public Works is responsible for the daily management of the Airport. The Airport has one runway oriented southeast/northwest (designated Runway 13/31) that measures 3,300 feet long by 75 feet wide. Runway 13/31 was widened from 60 feet to 75 feet due to concerns with the periodic presence of crosswind conditions (winds that blow across the runway rather than towards the ends of the runway). Runways are assigned two numbers that represent the compass heading the runway is pointing towards. For DVO, Runway 13 points to approximately 130 degrees on the magnetic compass, which is a southeasterly direction. Aircraft taking off to the south or landing from the north pointed to the south are using the 13 end of the runway. Likewise, Runway 31 points to approximately 310 degrees on the compass, which is a northwesterly direction. Aircraft taking off to the north or landing from the south pointed to the north are using the 31 end of the runway.

A system of manmade ditches and levees with pumps surround the runway to protect it from flooding. The characteristics of adjacent land uses and zoning, location of nearby communities, and general characteristics of the Airport vicinity are discussed below.

4.0.1 STUDY AREAS

For the purposes of this Environmental Impact Statement (EIS), two study areas have been defined. The General Study Area (GSA) depicts the communities surrounding the Airport. A further refined Detailed Study Area (DSA) depicts the potential land area that may be physically disturbed by the development of the Sponsor's Proposed Project. Exhibits depicting these two study areas show the existing political jurisdictional boundaries; noise-sensitive land uses; compatible land uses; major and minor streets and roadways; and major physical, geographic, and natural features, along with selected place names, road names, and names of major geographic features.

The GSA, shown on **Exhibit 4-2, *General Study Area***, covers approximately 12,655 acres and is defined as the area where potential indirect impacts may result from the Sponsor's Proposed Project or its alternatives (see Chapter Two, *Purpose and Need,* for detailed information regarding the Sponsor's Proposed Project). The DSA, shown in **Exhibit 4-3, *Detailed Study Area***, covers approximately 102 acres and is defined as the area where potential direct impacts may result from the Sponsor's Proposed Project or its alternatives.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Idaho
Nevada
Reno
Sacramento
Area of Map
California
San Francisco
PACIFIC OCEAN
Sonoma County
Napa
121
Petaluma
1
Gnoss Field Airport
Novato
San Pablo Bay
Vallejo
Marin County
101
80
San Rafael
Richmond
Berkeley
Oakland
San Francisco
1
PACIFIC OCEAN
San Francisco Bay
12
116
101
Sonoma County
121
Gnoss Field Airport
37
Solano County
37
Novato
1
Marin County
1
101
Contra Costa County
80
580
1
131
NOT TO SCALE
Environmental Impact Statement
Gnoss Field Airport
FINAL
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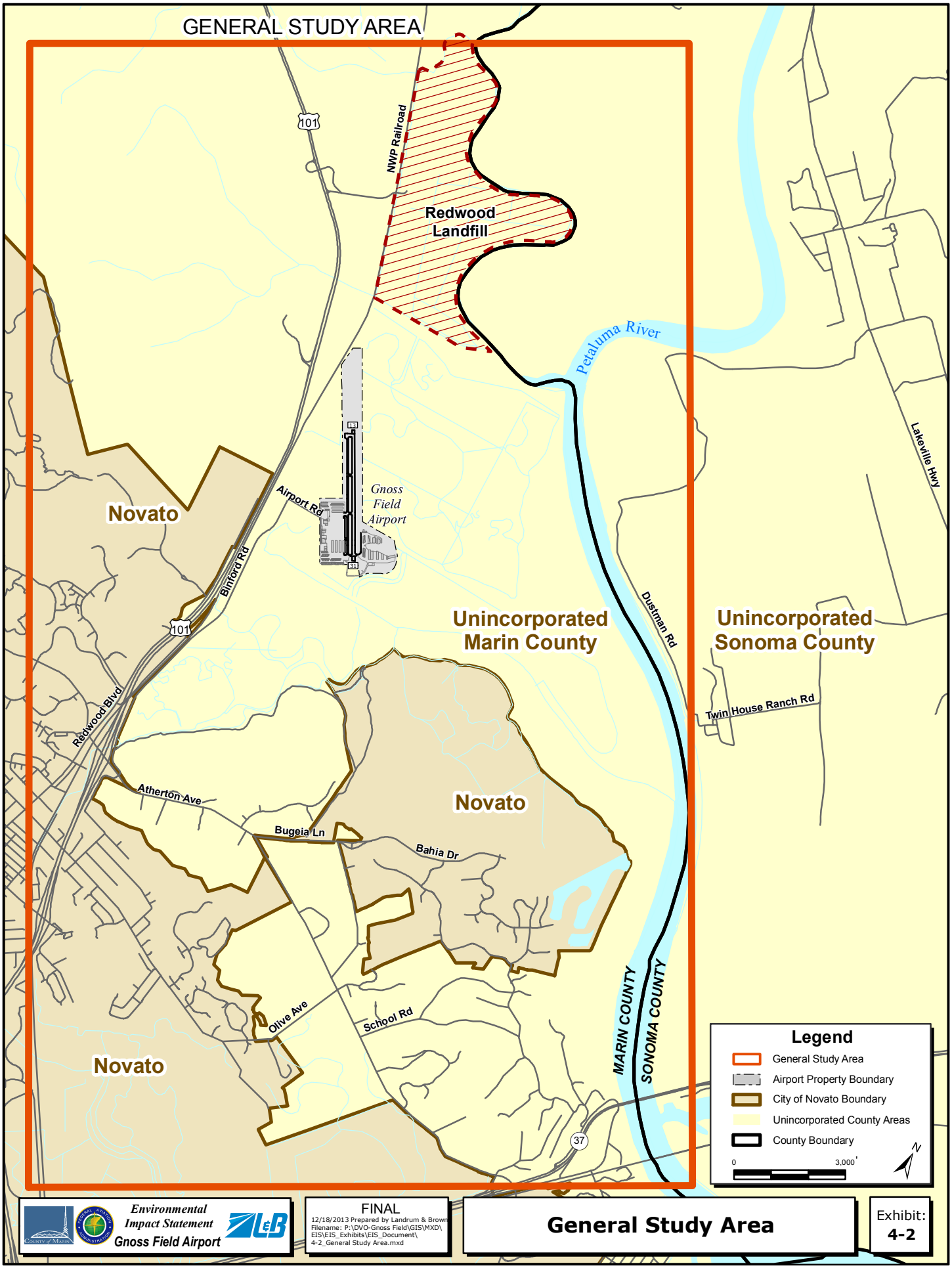
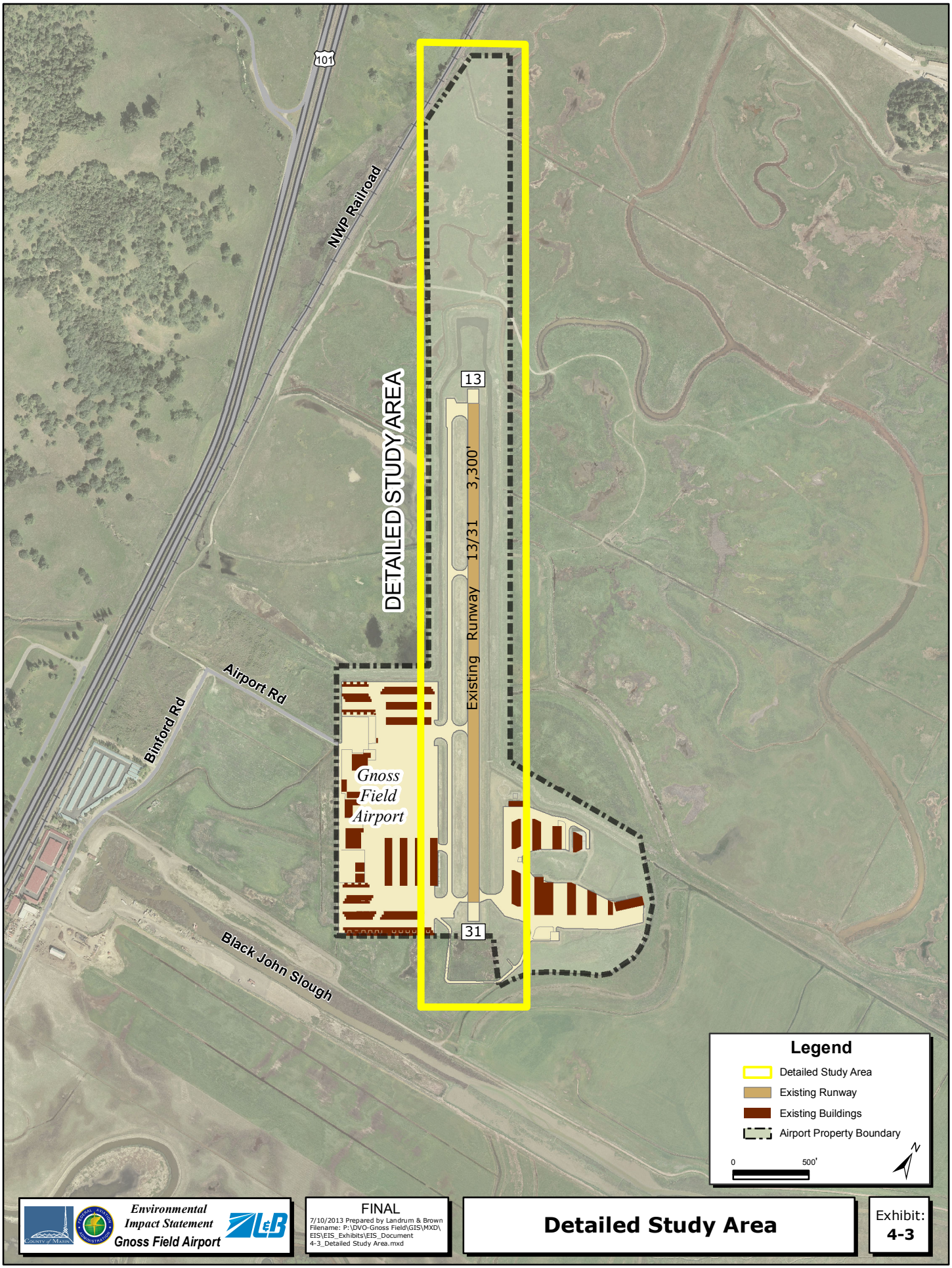
Airport Regional Location
Exhibit: 4-1


GENERAL STUDY AREA
101
NWP Railroad
Redwood Landfill
Petaluma River
Lakeville Hwy
Gnoss Field Airport
Airport Rd
Novato
Binford Rd
101
Redwood Blvd
Unincorporated Marin County
Unincorporated Sonoma County
Dustman Rd
Twin House Ranch Rd
Atherton Ave
Bugeja Ln
Bahia Dr
Novato
Olive Ave
School Rd
Novato
MARIN COUNTY
SONOMA COUNTY
37
Legend
General Study Area
Airport Property Boundary
City of Novato Boundary
Unincorporated County Areas
County Boundary
0
3,000'
Environmental Impact Statement
Gnoss Field Airport
FINAL
12/18/2013 Prepared by Landrum & Brown
Filename: P:\DVO-Gnoss Field\GIS\MXD\EIS\EIS_Exhibits\EIS_Document\4-2_General Study Area.mxd
General Study Area
Exhibit:
4-2



Environmental Impact Statement
Gnoss Field Airport

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Detailed Study Area

Exhibit: 4-3

4.0.2 CLIMATE AND TOPOGRAPHY

The climate in the Airport area is generally mild ranging from a mean monthly maximum temperature of 82 degrees Fahrenheit to a mean monthly minimum temperature of 39 degrees Fahrenheit.[2] Average rainfall is typically highest in December at approximately seven inches and lowest in July at less than one inch.[3] DVO is situated on reclaimed marshlands that lie on the eastern flank of low-lying coastal foothills. The area is nearly flat with elevations close to sea level. Several meandering sloughs and excavated drainage channels are located adjacent to the Airport, connecting with the Petaluma River to the east.[4] Topography to the west and northwest is dominated by Olompali Ridge, which reaches its highest point on Mount Burdell at a summit of approximately 1,556 feet above ground level (1,558-feet mean sea level), located approximately one and one-half miles west of the existing runway. The location of Mount Burdell, coupled with prevailing afternoon offshore wind direction during the spring and summer months leads to strong crosswinds at the Airport during those seasons.[5] Pinheiro Ridge trends northeast/southwest and lies one mile south of DVO with its highest point at approximately 278 feet above ground level (280 feet mean sea level). Bahia Ridge trends northwest and terminates approximately one mile southeast of DVO at the northeast end of Pinheiro Ridge.[6] **Exhibit 4-4*, Topography***, depicts the topography within the vicinity of DVO.

4.1 NOISE

The following section describes the existing noise exposure at DVO. The primary analysis is based on the development of the average annual Community Noise Equivalent Level (CNEL) noise exposure pattern for the Airport using the FAA's Integrated Noise Model (INM) version 7.0a.[7] The detailed description of the number of operations, runway use, flight track, and trip length data used as input to the INM version 7.0a for calculation of noise exposure is presented in Appendix E, *Noise Methodology*.

In addition to the noise modeling analysis, a two week noise measurement program was conducted at various locations around the Airport. The results of this program are summarized at the end of the section.

2 On-line at http://www.ncdc.noaa.gov. Retrieved July 2013.
3 On-line at http://www.ncdc.noaa.gov. Retrieved July 2013.
4 Cortright & Seibold, *Preliminary Design Report, Runway Extension, Gnoss Field*, 2002.
5 USGS GNIS: Burdell Mountain.
6 Cortright & Seibold, *Environmental Impact Report/Environmental Assessment, Marin County (Gnoss Field) Airport*, Working Paper 6, June 24, 1988.
7 INM Version 7.0a was used in the noise analysis as it was the most current version available at the time of analysis.

4.1.1 METHODOLOGY

The evaluation of the Airport noise environment was conducted using the methodologies developed by the FAA and published in FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions,* FAA Order 1050.1E, Change 1, *Environmental Impacts: Policies and Procedures* and Title 14 Code of Federal Regulations (CFR) Part 150, *Airport Noise Compatibility Planning*. The INM was used to produce noise contours and to analyze noise levels at noise-sensitive sites. FAA Order 1050.1E, Change 1, paragraph 14.1a, requires that the cumulative noise energy resulting from aviation activities must be established in terms of the yearly day-night average sound level (DNL) as FAA's primary noise metric. The paragraph also notes that FAA recognized the use of the CNEL metric as an alternative for use in California. The CNEL metric will be used for noise impact evaluation in this EIS and Marin County is using the CNEL metric in its noise evaluation in its EIR prepared in accordance with the California Environmental Quality Act (CEQA).

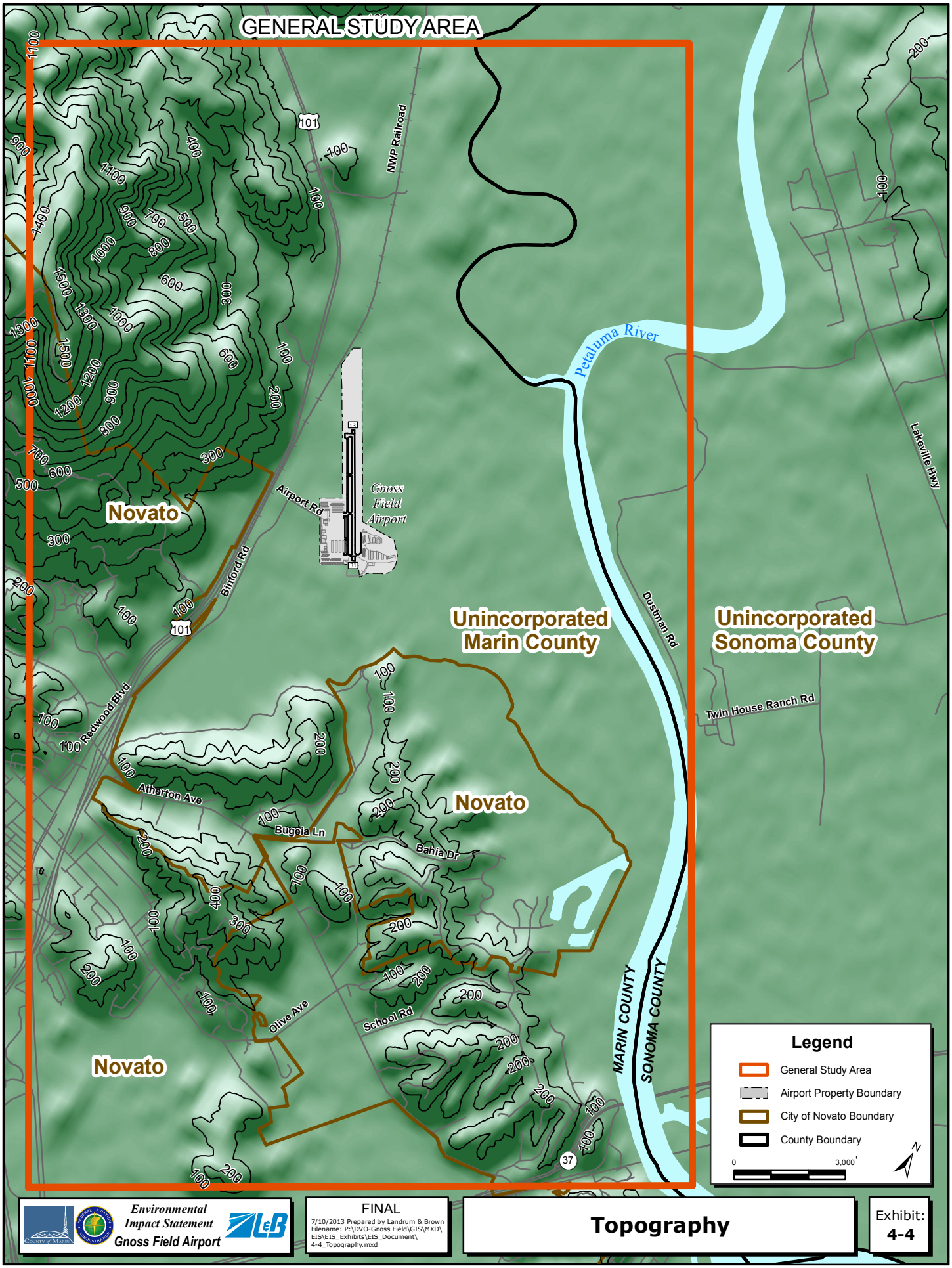
FAA's guidance also notes that CNEL contours, grid point, and/or change of exposure analysis be prepared for the future conditions. Paragraph 14.4i of FAA Order 1050.1E, Change 1 requires the following information be disclosed for the current condition:

1) The number of people living or residences within each noise contour at or above CNEL 65 dB, and
2) The location and number of noise sensitive uses (e.g., schools, churches, hospitals, parks, recreation areas) exposed to CNEL 65 dB or greater.

These requirements are also commensurate with the requirements for the CEQA analysis.

4.1.2 EXISTING NOISE EXPOSURE

Exhibit 4-5, *Existing Conditions (2008) Community Noise Equivalent Level*, reflects the noise contour calculated with INM present at the Airport under existing conditions. The noise contour is shown over a map of the local Airport area that includes the specific land uses in the area. **Table 4-1** summarizes the noise sensitive land uses and areas within each noise contour level. Noise contours are presented for the 65, 70, and 75 CNEL. The FAA uses the 65 CNEL as the noise level in which noise-sensitive land uses (residences, churches, schools, libraries, and nursing homes) become significantly impacted. Below the 65 CNEL, all land uses are determined to be compatible.



Environmental Impact Statement
Gnoss Field Airport

FINAL

7/10/2013 Prepared by Landrum & Brown
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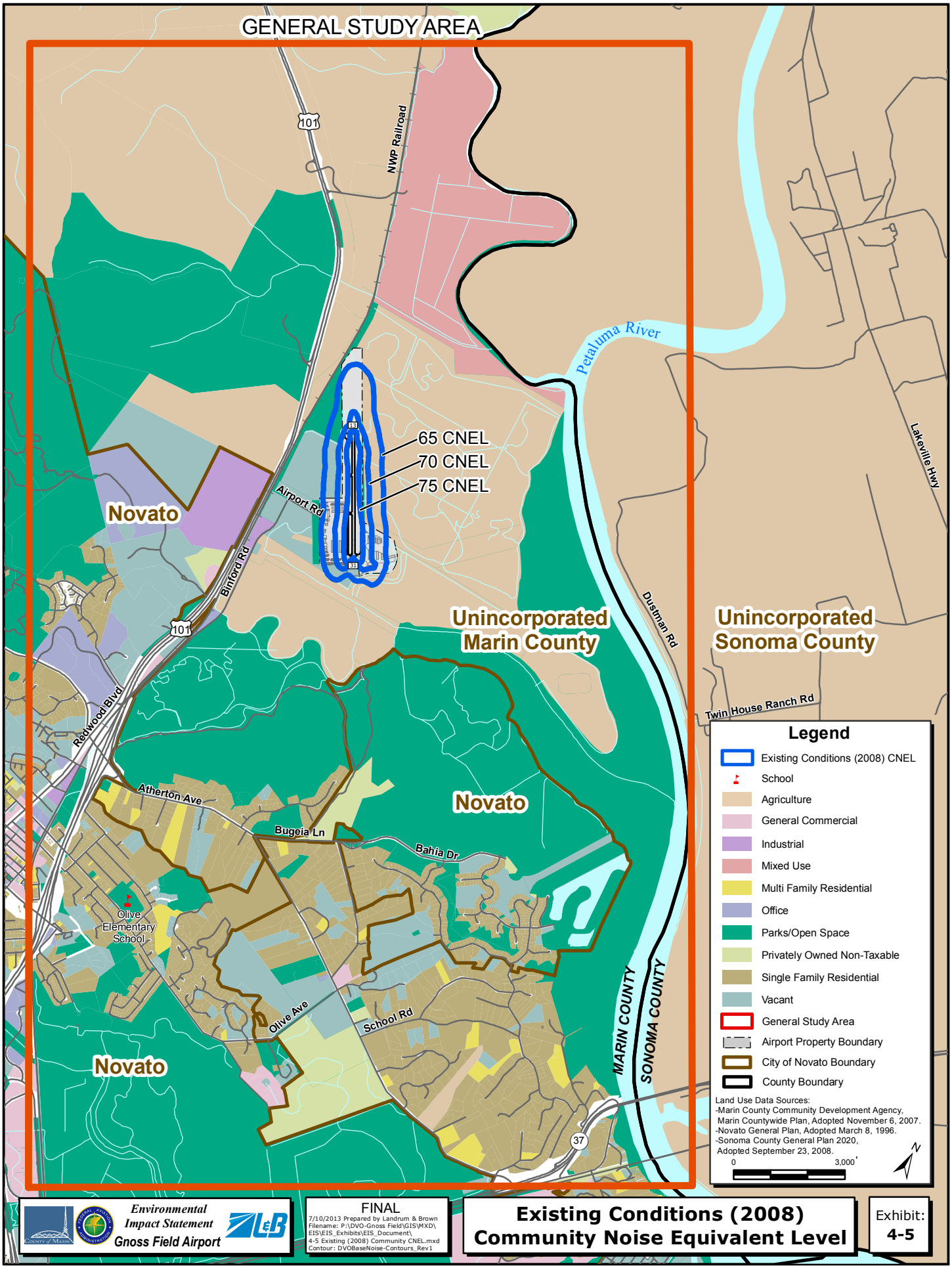
Topography

Exhibit: 4-4


GENERAL STUDY AREA
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NWP Railroad
Petaluma River
65 CNEL
70 CNEL
75 CNEL
Airport Rd
Novato
Binford Rd
101
Unincorporated
Marin County
Unincorporated
Sonoma County
Dustman Rd
Lakeville Hwy
Twin House Ranch Rd
Redwood Blvd
Atherton Ave
Bugeia Ln
Bahia Dr
Novato
Olive
Elementary
School
Olive Ave
School Rd
Novato
MARIN COUNTY
SONOMA COUNTY
37
Legend
Existing Conditions (2008) CNEL
School
Agriculture
General Commercial
Industrial
Mixed Use
Multi Family Residential
Office
Parks/Open Space
Privately Owned Non-Taxable
Single Family Residential
Vacant
General Study Area
Airport Property Boundary
City of Novato Boundary
County Boundary
Land Use Data Sources:
-Marin County Community Development Agency,
Marin Countywide Plan, Adopted November 6, 2007.
-Novato General Plan, Adopted March 8, 1996.
-Sonoma County General Plan 2020,
Adopted September 23, 2008.
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Gnoss Field Airport
FINAL
7/10/2013 Prepared by Landrum & Brown
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EIS\EIS_Exhibits\EIS_Document\
4-5 Existing (2008) Community CNEL.mxd
Contour: DVOBaseNoise-Contours_Rev1
Existing Conditions (2008)
Community Noise Equivalent Level
Exhibit:
4-5

Table 4-1
AREAS WITHIN EXISTING NOISE EXPOSURE CONTOUR
Gnoss Field Airport

CONTOUR RANGE	EXISTING CONDITIONS (2008)			
	SQUARE MILES	ACRES	NON-RESIDENTIAL NOISE SENSITIVE LAND USES	RESIDENTIAL NOISE SENSITIVE HOUSING UNITS
65-70 CNEL	0.17	111.6	0	0
70-75 CNEL	0.07	45.4	0	0
75 + CNEL	0.05	29.9	0	0
65 + CNEL	***0.29***	***186.9***	***0***	***0***

Source: Landrum & Brown, 2009.

A CNEL noise contour does not represent the noise levels present on any specific day, but represents the sound pressure energy-average of all 365 days of operation during the year. Noise contours extend from an airport along the extended runway centerline, reflective of the flight tracks used by all aircraft. The relative distance of a contour from the airport along each route is a function of the frequency of use of each runway end for total arrivals and departures, as well as its use at night, and the type of aircraft assigned to it. The size and shape of the noise contours for DVO are a function of the combination of flight tracks and runway use gathered from Airport radar data representative of the existing conditions (2008).

The radar data indicated that traffic largely followed the Airport's requested voluntary noise abatement runway use program with departures taking off to the north on runway end 31 and arrivals approaching from the north on runway end 13. Approximately 90 percent of the departures were made to north with 10 percent of departures to the south. Conversely, about 90 percent of the arrivals were made to south with about 10 percent of the arrivals occurring from the south. As a result, the Existing Condition (2008) noise contour is longer and wider to the north of the Airport than it is to the south. To the north of the Airport, the noise contour extends approximately 1/3 of a mile north of the north end of the runway to a point just east of the railroad tracks. The shape of the noise contour is generally aligned with the runway and reflects the combination of takeoffs to the north and arrivals from the north which is 90 percent of the activity at the Airport. The contour covers an area that comprises Airport property and extends northward off Airport property over areas of compatible land use. The higher noise levels of 70 and 75 CNEL cover a progressively smaller area of similar compatible land uses to the north.

The noise contour runs adjacent to the Airport runway with the contour lines generally parallel to the runway alignment. To the south, the 65 CNEL noise contour only extends 500 feet south of Airport property over both commercial and agricultural land uses. The higher noise levels of 70 and 75 CNEL contours remain largely over Airport property and their shape is associated with the start of takeoff

roll noise associated within a high percentage of departures. As Exhibit 4-5 illustrates there are no residential or noise sensitive land uses within any of the noise contour levels evaluated. Consequently, there are no identifiable significant noise impacts associated with the existing aircraft operations at the Airport.

4.1.3 NOISE MEASUREMENTS

To complement the noise modeling of INM, a program was developed to measure noise exposure levels in areas surrounding the Airport. The measurement program included long-term sites where measurements were taken for several days and short-term sites where measurements were taken for several hours. The effort was designed to collect cumulative CNEL noise levels, aircraft single event levels, and ambient levels at each of the six long-term sites. Similar data was also collected for the short-term sites, with the exception of the 24-hour CNEL values. The noise measurements contain all noise recorded at a site including aircraft and non-aircraft events. The findings provide context of background and cumulative noise levels in which any changes in modeled noise exposure resulting from the proposed project alternatives can be considered. Thus, stake holders, FAA decision makers, and the general public have a context when considering the relevant contributions of project-related noise exposure as compared to noise levels produced without project-related changes.

In addition to CNEL several other metrics were also computed from the measured data as supplemental information. These include the following:

- L50 – Sound level at which 50 percent of the measured one-second samples are above and 50 percent are below. This is generally considered to be an estimation of background noise levels by FAA.
- Aircraft Leq (or $CNEL)_{(obs)}$ – Sound level of the observed aircraft events averaged across the observation time period (obs).
- Non-Aircraft Leq (or $CNEL)_{(obs)}$ – Average sound level of noise during observation time less the aircraft event noise.
- Total Leq (or CNEL) – Total average equivalent sound level during the measurement period.
- Aircraft Lmax – Range of maximum sound level associated with observed aircraft events.

The noise measurement program focused on collecting a sample of data within specific areas that were directly related to the areas of past noise concerns, the range of alternatives evaluated, and the local land uses within the GSA.

The measurement program took place for a two-week period from Saturday, May 23, 2009 through Friday, June 5, 2009. The short-term noise measurements were taken at 20 locations, and consisted of collecting one hour's worth of noise measurement data at each location. A technician was present at each of these sites for the one hour period and logged any aircraft noise events that occurred. The locations were chosen from residential areas south of Gnoss Field.

Long-term noise measurements were conducted at six locations. These locations included three residences south of Gnoss Field, Olompali State Historic Park, an access road north of Gnoss Field, and a walking trail south of Gnoss Field. In general, noise data for the long-term measurements were collected continuously 24 hours per day for a period of seven days, although for some of the long-term sites, the collection time was less than seven days. Since it was not practical to staff each long-term site with an observer to log events, continuous digital audio recordings were taken for the duration of the measurements at each site.

Table 4-2 provides a brief depiction of the 26 measurement locations chosen for this program along with their general land use type. The sites with the "L" prefix identify the long-term sites and those with the "S" prefix indicate the short-term sites.

Table 4-2
NOISE MEASUREMENT PROGRAM MONITORING SITES
Gnoss Field Airport

SITE	LOCATION	MEASUREMENT DATE(S) (TIMES)
L1	265 Saddle Wood	5/23 – 5/30
L2	160 H Lane	5/23 – 5/30
L3	Olompali State Park	5/27 – 5/29
L4	600 Santana Road	5/30 – 6/5
L5	Access Road	5/30 – 6/5
L6	Walking Trail	5/30 – 6/5
S1	Saddle Wood Drive	05/25 (13:41-14:41)
S2	Bugeia Lane	05/26 (13:05-14:05)
S3	Bahia Drive Open Space	05/26 (16:39-17:39)
S4	End of Bolero Court	05/27 (12:27-13:28)
S5	Park on Topaz Drive	05/27 (13:37-14:38)
S6	Bahia Drive and Topaz Drive	05/27 (14:51-15:51)
S7	School Road and Atherton Avenue	05/27 (17:36-18:36)
S8	H Lane Driveway	05/28 (12:32-13:33)
S9	Topaz Drive Sidewalk	05/28 (14:23-15:23)
S10	End of William Road	05/28 (15:37-16:38)
S11	Malobar Drive and Topaz Drive	05/29 (15:49-16:49)
S12	H Lane at Kenilworth Court	05/30 (08:41-09:42)
S13	End of Topaz Drive	05/29 (18:13-19:15)
S14	Cerro Crest Drive	05/30 (15:34-16:35)
S15	Archibald Lane	05/31 (09:09-10:10)
S16	Alpine Road and William Road	05/31 (11:16-12:16)
S17	Lindsey Court	06/01 (10:46-11:46)
S18	Baruna Court	06/02 (10:20-11:21)
S19	River Vista Court	06/03 (10:27-11:33)
S20	Crest Road and Guisela Court	06/04 (09:53-10:59)

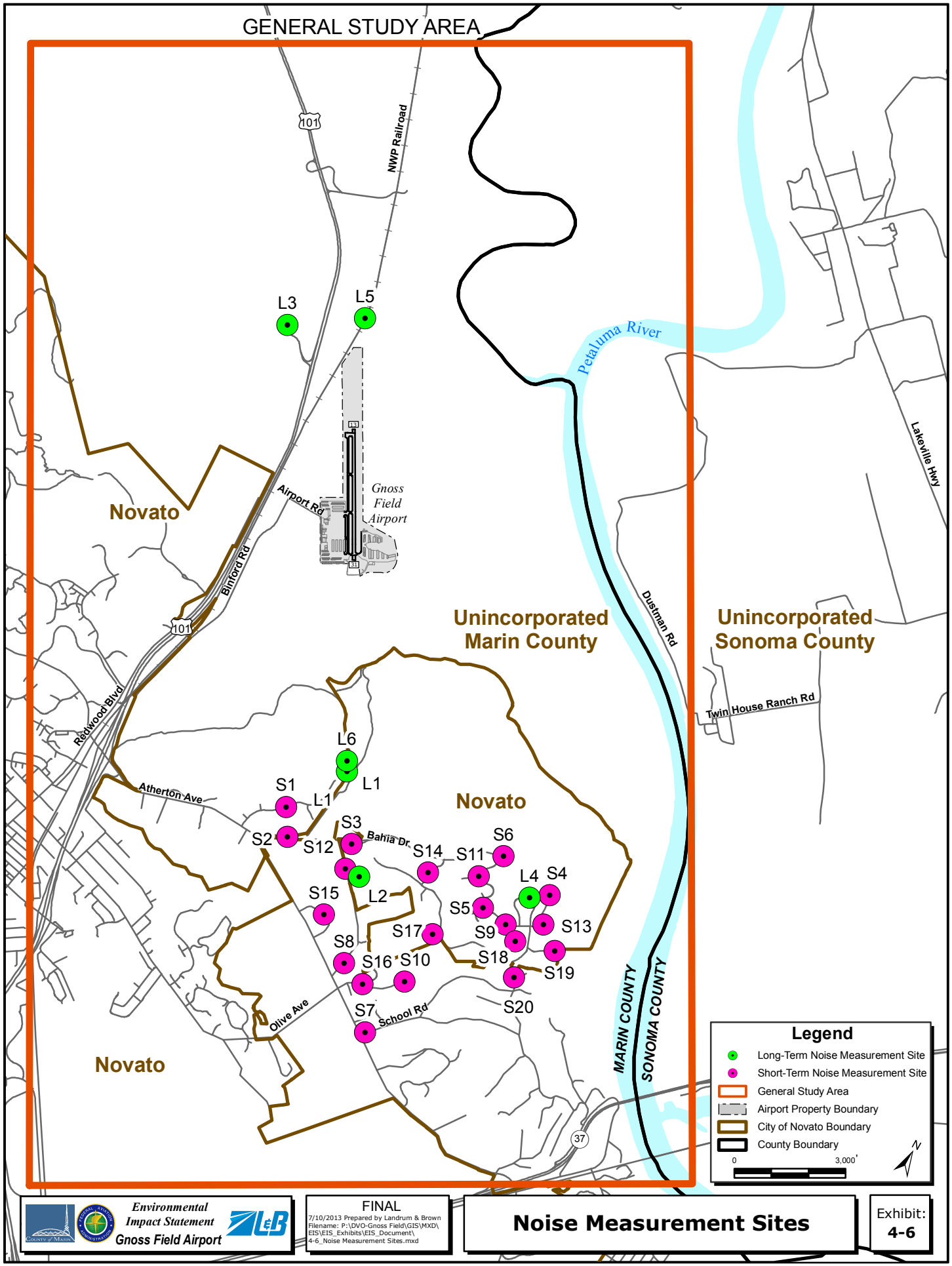
Source: Landrum & Brown, 2009.

Exhibit 4-6, *Noise Measurement Sites*, illustrates the locations of all the sites on a map of the area. As the exhibit illustrates, the measurement program generally focused on the residential areas south of Gnoss Field. Two of the long-term sites were located north of the airfield to capture noise to the north where most of the aircraft operations occur. The sites to the south cover the residential areas nearest to the airfields where there have been noise concerns in the past.

Appendix E presents a detailed discussion of the measurement program including a description of each of the sites as well as more information regarding location, study area position, land use type, and the procedures used and the detailed results of the program.

The results of the measurement program are generally summarized in **Table 4-3**. The data for each site is presented in terms of the CNEL values for each of the long-term sites and the one-hour Leq for the short-term sites. Similarly, the L50 values for each site are also presented. The L50 provides an estimate of what could be considered background noise levels for each site. This should be considered an estimate as even the long-term sites captured only a small sample of the annual noise that may occur at each location.

Table 4-3 presents a summary of the noise levels associated with the observed aircraft events for each measurement site. The range of maximum noise values is presented separately for jet and propeller aircraft events. It should be noted that the full range of values is presented for the short-term sites as the observation logs were able to confirm each aircraft event. For the long-term sites, the range presented represents only aircraft events that were 65 dB or higher. This is a result of the methodology used to correlate aircraft events to noise level measurements. Since 24-hour observations were not possible, radar data was evaluated to attempt to correlate aircraft overflights at each site to the noise levels. Unfortunately, the resolution of the radar data was found to be insufficient to effectively correlate aircraft activity to one-second noise levels. As a result, the audio recordings were used to identify periods of aircraft noise. This process required that a noise threshold (65 dB) be identified to focus the audio review effort to time periods where aircraft events were likely.


GENERAL STUDY AREA
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NWP Railroad
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Petaluma River
Lakeville Hwy
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Gnoss Field Airport
Binford Rd
101
Unincorporated Marin County
Unincorporated Sonoma County
Dutchman Rd
Twin House Ranch Rd
Redwood Blvd
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Atherton Ave
Novato
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Bahia Dr
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School Rd
Olive Ave
Novato
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37
Legend
Long-Term Noise Measurement Site
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Noise Measurement Sites
Exhibit: 4-6

Table 4-3
NOISE MEASUREMENT PROGRAM RESULTS SUMMARY
Gnoss Field Airport

SITE	CNEL	L_{50}	AIRCRAFT EVENTS – L_{MAX} RANGE	
			JET	PROP.
L1	51.8	42.9	65.3 – 70.7	65.3 – 79.7
L2	47.7	40.0	NA	66.5 – 72.5
L3	54.9	47.6	65.1 – 76.3	65.2 – 80.5
L4	48.0	36.6	68.3 – 72.4	65.1 - 71
L5	55.5	49.7	66.9 - 92	65.2 – 84.9
L6	57.8	43.7	65.1 – 75.8	65.1 – 76.1
	$Leq_{(1\text{-}hr)}$			
S1	47.6	35.8	48.9 - 48.9	42.7 – 59.5
S2	56.4	46.8	52.2 – 56.3	58.9 – 60.5
S3	54.4	46.4	48.7 – 59.6	45.3 – 62.2
S4	43.2	37.4	41.3 - 41.3	41.1 – 65.1
S5	49.8	38.4	NA	39.8 – 62.2
S6	50.7	44.0	NA	47.7 – 60.6
S7	54.8	46.5	NA	52.6 – 66.7
S8	49.1	38.1	43.9 – 54.8	40.6 – 60.7
S9	53.8	43.1	49.3 – 51.1	46.2 – 54.3
S10	44.8	41.5	51.4 – 61.7	44.6 – 58.5
S11	49.9	44.5	45.3 – 54.7	43.7 – 59.8
S12	48.0	43.5	50.4 - 50.4	45.9 – 56.7
S13	50.5	40.5	40.5 – 46.9	38.3 – 50.1
S14	58.0	47.7	47.6 – 67.7	43.8 – 67.3
S15	43.9	40.6	41.4 – 44.5	42 – 48.9
S16	43.2	41.5	40.6 – 58.1	42.1 – 56.9
S17	46.0	39.4	41.8 – 61.1	39.2 – 62.8
S18	47.5	38.7	47.7 - 47.7	41.6 – 65.9
S19	48.2	40.5	53.4 - 53.4	39.2 – 55.7
S20	42.7	34.2	41.1 – 60.6	34.1 – 48.1

Source: Landrum & Brown, 2009.

4.2 COMPATIBLE LAND USE

The Airport is located entirely within unincorporated Marin County, California. The majority of the GSA for this EIS is located within Marin County, with the exception of approximately 1,788 acres of the northeastern portion of the GSA located within neighboring Sonoma County, California. The location of the Airport within these political jurisdictions is shown on Exhibit 4-2, *General Study Area*.

4.2.1 EXISTING LAND USE

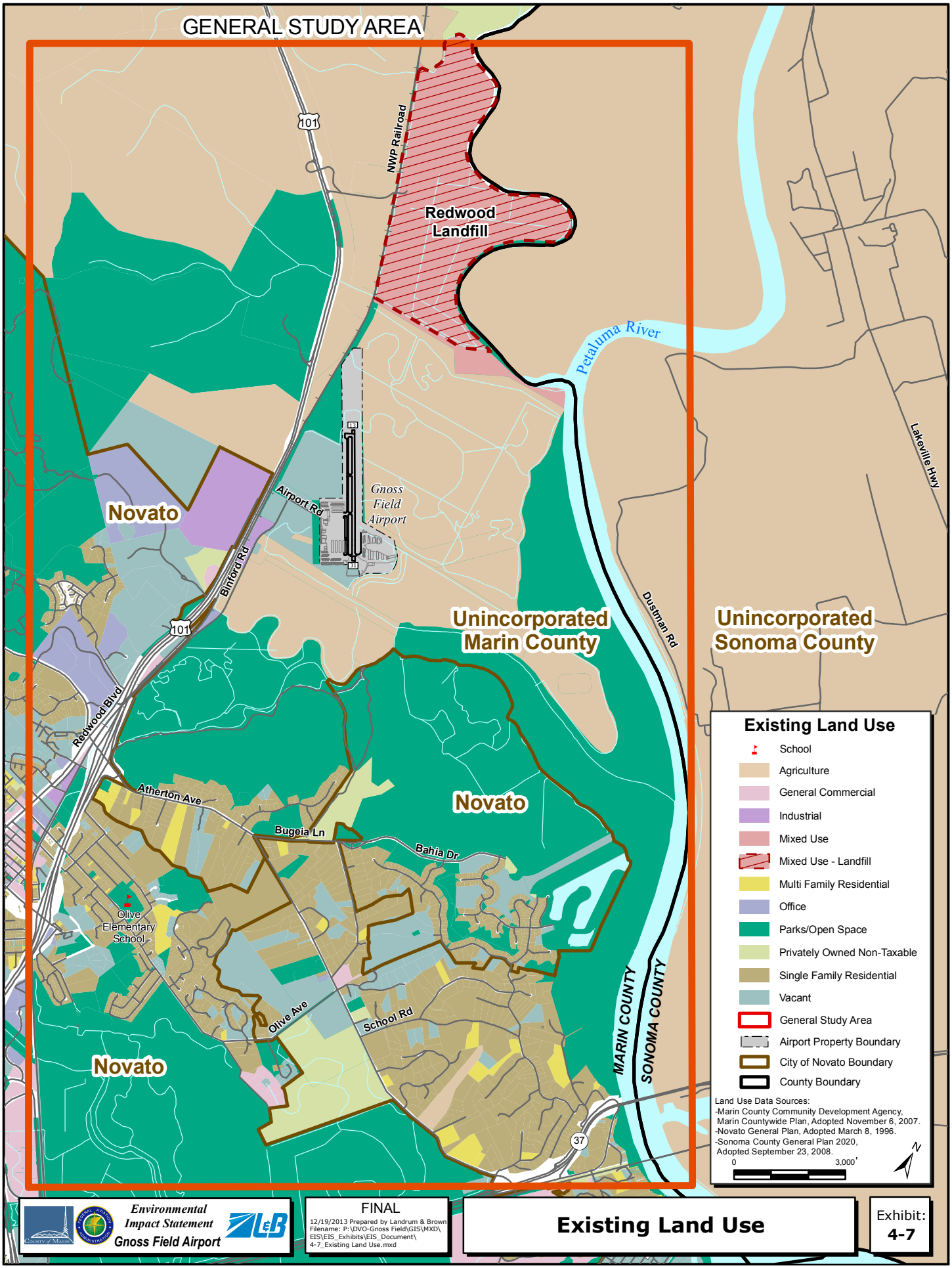
Portions of Marin County, the City of Novato (within Marin County), and Sonoma County are located within the GSA. Each of these entities has categorized land use in the vicinity of DVO, as shown on **Exhibit 4-7, *Existing Land Use***. The land use designations and descriptions used by Marin County, the City of Novato, and Sonoma County are listed in **Table 4-4**.

Within Marin County, the Airport property is categorized as publically-owned non-taxable land. The area surrounding DVO is predominantly agricultural, vacant, and open space to the east and south, including the Burdell Unit of the California Department of Fish and Game Petaluma Marsh Wildlife Area, with light industrial/office areas to the north and west. Marin County has avigation easements on some properties adjacent to the north and south of the Airport to prevent the construction of structures that would inhibit the takeoff and landing of aircraft at the Airport.

Redwood Landfill, a 420-acre site owned by Waste Management, is located approximately one-half mile northwest of DVO, directly east of Highway 101. Light industrial and office uses are located west of DVO along Binford Road. Industrial areas are also located in the eastern portion of the GSA near the border with Sonoma County. Olompali State Historic Park is categorized as publically-owned non-taxable land. Other land use categories include office, general commercial, and residential in the southern portion of the GSA.[8] Within Sonoma County, the areas located in the GSA are used for agriculture.[9]

The City of Novato has designated the DVO property as a Community Facility. The *Novato General Plan* states that in the areas outside the City limits in unincorporated Marin County, agricultural activities are present west of DVO, south of Bel Marin Keys, and within the Indian Valley area. Other areas outside the City limits are predominantly open space. Within the City of Novato, the land use is predominantly residential in the valley areas west of Highway 101. Most units are single-family detached on lots under one acre in size. Commercial uses are concentrated downtown along Grant Avenue, along Redwood Boulevard, in pockets along Highway 101, and in various small clusters and convenience centers. Offices are located along Highway 101, in and around Downtown, near the Novato Community Hospital, along Novato and South Novato Boulevards, and within the industrial parks. Novato Industrial Park contains the bulk of the City's warehousing, distribution, and manufacturing uses. Several industrial operations remain near the downtown, between the railroad and Redwood Boulevard.[10]

[8] Marin Community Development Agency. *Marin Countywide Plan*, adopted November 6, 2007. On-line at: http://www.co.marin.ca.us/depts/cd/main/fm/index.cfm . Retrieved October 8, 2013.
[9] *Sonoma County General Plan 2020*, Adopted September 23, 2008.
[10] *Novato General Plan*, Adopted March 8, 1996.


GENERAL STUDY AREA
101
NWP Railroad
Redwood Landfill
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Bahia Dr
Novato
Olive Elementary School
Olive Ave
School Rd
Novato
MARIN COUNTY
SONOMA COUNTY
37
Existing Land Use
School
Agriculture
General Commercial
Industrial
Mixed Use
Mixed Use - Landfill
Multi Family Residential
Office
Parks/Open Space
Privately Owned Non-Taxable
Single Family Residential
Vacant
General Study Area
Airport Property Boundary
City of Novato Boundary
County Boundary
Land Use Data Sources:
-Marin County Community Development Agency, Marin Countywide Plan, Adopted November 6, 2007.
-Novato General Plan, Adopted March 8, 1996.
-Sonoma County General Plan 2020, Adopted September 23, 2008.
0
3,000'
Environmental Impact Statement
Gnoss Field Airport
FINAL
12/19/2013 Prepared by Landrum & Brown
Filename: P:\DVO-Gnoss Field\GIS\MXD\EIS\EIS_Exhibits\EIS_Document\4-7_Existing Land Use.mxd
Existing Land Use
Exhibit: 4-7

Table 4-4
LAND USE CLASSIFICATIONS
Marin County, City of Novato, and Sonoma County, California
Gnoss Field Airport

LAND USE DESIGNATION	DESCRIPTION
MARIN COUNTY	
Single Family (SF3)	Residential: 1 unit/1-5 acres
Multi Family (MF4)	Residential: 11-30 units/acre
Planned Residential (PR)	1 unit/1-10 acres
Residential Commercial (RC)	FAR = 0.01 TO 0.03
Industrial (IND)	FAR = 0.04 TO 0.35
Public Facility/Industrial (PF-IND)	FAR = 0.04 TO 0.35
Public Facility/Recreational Commercial (PF-RC)	FAR = 0.01 TO 0.30
Public Facility/Agricultural (PF-AG3)	Residential: 1 unit/1-9 acres
Open Space (OS)	
Agricultural (AG1)	Residential: 1 unit/31-60 acres
Agriculture and Conservation (AGC3) (AGC1)	AGC3 = Residential: 1 unit/2-9 acres ACC1 = Residential: 1 unit/31-60 acres
Mineral Resource Area	
Ridge and Upland Greenbelt Area	For the preservation of visual quality (per Community Design Policy DES-4.1 of *Marin Countywide Plan,* Adopted November 6, 2007)
Baylands Corridor	
CITY OF NOVATO	
Rural Residential (RR)	Up to 0.49 dwelling units per acre
Very Low Density Residential (RVL)	0.5 to 1.0 dwelling units per acre
Low Density Residential (R1)	1.1 to 5.0 dwelling units per acre
Medium Density Detached Residential (R4)	4.1 to 7.0 dwelling units per acre
Medium Density Residential (R5)	5.1 to 10.0 dwelling units per acre
Medium Density Multiple Family Residential (R10)	10.1 to 20.0 dwelling units per acre
High Density Multiple Family Residential (R20)	20.1 to 30.0 dwelling units per acre
Mixed Use (MU)	Maximum FAR of 0.4 for commercial uses and up to 0.8 may be allowed if housing is incorporated
Neighborhood Commercial (CN)	Maximum FAR of 0.4 with an increase to 0.6 if housing is included, provided the difference between FAR 0.4 and 0.6 is used for housing
General Commercial (CG)	Maximum FAR of 0.4
Downtown Core	Maximum FAR of 1.2 for commercial uses up to 2.0 FAR may be allowed for housing historic preservation or exceptional design in conformance with downtown specific plan guideline
Commercial/Industrial (CI)	Maximum FAR of 1.0
Business and Professional Office (BPO)	Maximum FAR of 0.4

Table 4-4, Continued
LAND USE CLASSIFICATIONS
Marin County, City of Novato, and Sonoma County, California
Gnoss Field Airport

LAND USE DESIGNATION	DESCRIPTION
CITY OF NOVATO, *Continued*	
Research/Education-Institutional (REI)	Maximum FAR of 0.2 for non-residential uses, maximum residential density is 1.0 dwelling unit per acre
Light Industrial/Office (LIO)	Maximum FAR of 0.4 except for Novato Industrial Park and Hamilton Hanger Area where the maximum FAR is 0.6
Open Space (OS)	
Agriculture (AG)	Maximum density of 1 dwelling unit per 60 acres
Conservation (CON)	Maximum density is 1 dwelling unit per 10-60 acres
Parkland (P)	
Community Facilities (CF)	Maximum FAR of 0.8
SONOMA COUNTY	
Diverse Agriculture	10-60 acres per residential unit
Land Extensive Agriculture	60-320 acres per residential unit
Land Intensive Agriculture	20-100 acres per residential unit
Resources and Rural Development	20-320 acres per residential unit
Rural Residential	1-20 acres per residential unit
Urban Residential	High density: 12-20 dwelling units per gross acre Medium density: 6-12 dwelling units per gross acre Low density: 4-6 dwelling units per gross acre
Recreation/Visitor Serving Commercial	Outdoor recreation facilities and tourist commercial uses
Public/Quasi-Public	
General Commercial	Intense commercial uses
Limited Commercial	Limited commercial uses
Limited Commercial Traffic Sensitive	Limited commercial uses, severely constrained by traffic congestion
General Industrial	Intense industrial uses
Limited Industrial	Limited industrial uses

Note: FAR = Floor Area Ratio

Sources: Marin County Community Development Agency, *Marin Countywide Plan*, Adopted November 6, 2007. *Novato General Plan*, Adopted March 8, 1996. *Sonoma County General Plan 2020*, Adopted September 23, 2008

4.2.2 FUTURE PLANNED LAND USE

The *Marin Countywide Plan,* the *Novato General Plan,* and the *Sonoma County General Plan 2020* each describe planning goals for the area surrounding DVO that is included in the GSA. Future planned land-use is shown on **Exhibit 4-8, *Future Land Use***, and is described in the following discussion.

The *Marin Countywide Plan* lists the following planning goals for the Novato Planning Area, which includes the DVO area.[11]

- Designate Land Use in North Novato. Publicly owned lands shall be designated open space, exclusive of DVO, which shall retain its Industrial land use designation with a Public Facilities combining designation, consistent with the approved and planned development under the *Airport Land Use Master Plan*. Most of the lands east of the Northwestern Pacific Railroad tracks are within the Baylands Corridor. Lands north of Gnoss Field, Birkenstock, and the Buck Center and not within the Baylands Corridor are in the Inland Rural Corridor. Developed parcels not within the Baylands Corridor and south of Olompali State Park are in the City-Centered Corridor. Lands within the City-Centered Corridor and Baylands Corridor shall be designated for industrial use, with master plans required for development; for planned residential at a density of 1 unit per 1 to 10 acres; for recreational-commercial use; and agriculture and conservation at a residential density of 1 unit per 10 to 60 acres. Commercial uses on lands surrounding the Airport shall be limited to those that are Airport related or compatible with the Airport.
- Designate Land Use in West Novato. Land use for West Novato shall include single-family residential, ranging from 4 units per acre to 1 unit per 5 acres; planned residential, ranging from 1 unit per acre to 1 unit per 10 acres; and agriculture, ranging from 1 unit per 1 acre to 1 unit per 60 acres. Publicly owned open space is also designated.
- Designate Land Use in Southwest Novato. Land use in the Southwest Novato area shall include agriculture at 1 unit per 31 to 60 acres. Publicly owned open space is also designated.
- Designate Land Use in Bel Marin Keys. Portions of Bel Marin Keys such as tidal marshes and low-lying grasslands are within the Baylands Corridor. Agricultural land uses shall be designated as agriculture and conservation at a density of 2 to 10 acres per housing unit. In the developed portion of Bel Marin Keys, multi-family residential density shall be designated at 11 to 30 units per acre and single-family density at 1 to 7 units per acre. Lands owned by the Coastal Conservancy undergoing wetland habitat restoration and other publicly owned lands shall be designated as open space.

[11] Marin Community Development Agency, *Marin Countywide Plan*, adopted November 6, 2007. On-line at: http://www.co.marin.ca.us/depts/cd/main/fm/index.cfm. Retrieved October 8, 2013.

The *Novato General Plan* designates the land use in the DVO-area as "Community Facilities," which is a designation that includes public buildings, schools, recreation and cultural facilities, museums, public libraries, utility facilities, transformer stations, water and sewage treatment plants, solid waste transfer facilities, recycling facilities, and related easements, City offices, fire and police stations, hospitals, churches and privately-owned uses operating in conjunction with public uses. The City of Novato planning goal for this area is to promote development and conservation in this land use pattern.[12]

The *Sonoma County General Plan* designates land use in the "Petaluma and Environs" Planning Area, which includes the western portion of the County that is included in the GSA, as agriculture. Sonoma County's planning goals for agriculture lands are to continue to protect a full range of agricultural uses and to limit residential intrusion.[13]

4.3 SOCIOECONOMIC OVERVIEW

Population, growth, and employment trends are used to evaluate the socioeconomic characteristics of an area. A socioeconomic overview for the land area surrounding DVO identifies the patterns of growth and development.

Based on 2007 estimates by the U.S. Census Bureau, 51,233 people reside within the City of Novato. Housing units total 20,537. The racial makeup is roughly 76.1 percent White, 3.1 percent Black or African American, 0.8 percent Native American, 5.4 percent Asian, 11.9 percent from other races, and 2.7 percent from two or more races. Residents of any race who also identified themselves as Hispanic or Latino account for 19.8 percent of the population.

The average household size is 2.6. The median age is 41.4 years. The majority of the population is 18 years and older (78.2 percent). Persons aged 65 and older make up 13.0 percent of the population and those aged 5 and under make up 6.0 percent of the population. The median household income is $78,895. The median family income is $91,890. The per capita income for the city is $37,605. Approximately 5.7 percent of families and 7.3 percent of individuals are below the poverty line.[14]

4.3.1 POPULATION TRENDS

Population trends and forecasts for the DVO area, in comparison to the nine-county San Francisco Bay Area, and to the State of California as a whole are presented in **Table 4-5**. As shown in **Table 4-6a**, the Marin County population of 248,794 in 2008 accounts for 3.5 percent of the population of the nine-county San Francisco Bay Area.[15]

[12] *Novato General Plan*, adopted March 8, 1996.
[13] *Sonoma County General Plan 2020*, Adopted September 23, 2008.
[14] U.S. Census Bureau, *American Factfinder, Novato City, California, 2005-2007 Data Profile Highlights*.
[15] Association of Bay Area Governments, on-line at www.abag.ca.gov

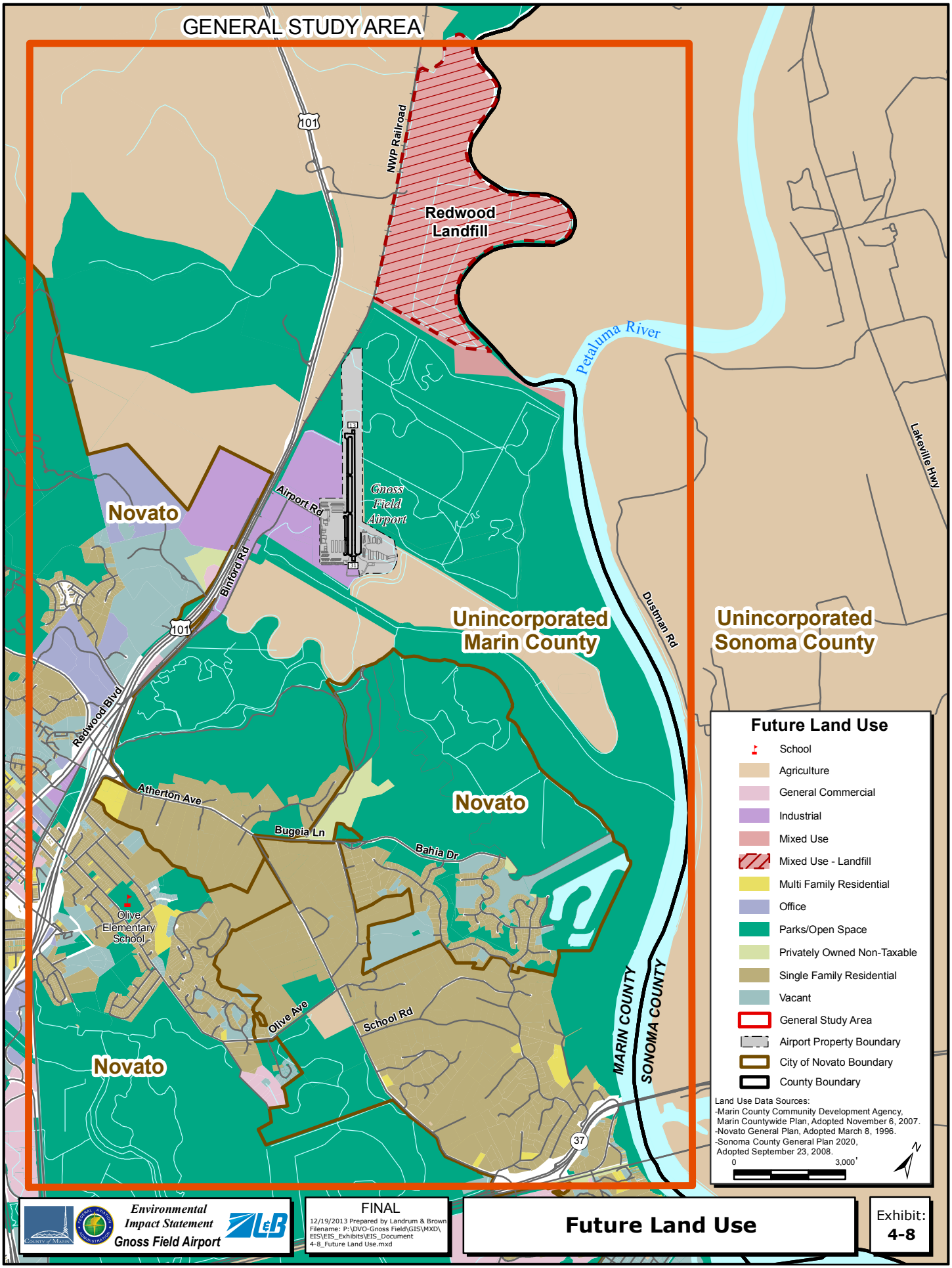
GENERAL STUDY AREA
101
NWP Railroad
Redwood Landfill
Petaluma River
Lakeville Hwy
Novato
Airport Rd
Gnoss Field Airport
Binford Rd
101
Unincorporated Marin County
Unincorporated Sonoma County
Dustman Rd
Redwood Blvd
Atherton Ave
Bugeja Ln
Bahia Dr
Novato
Olive Elementary School
Olive Ave
School Rd
Novato
MARIN COUNTY
SONOMA COUNTY
37
Future Land Use
School
Agriculture
General Commercial
Industrial
Mixed Use
Mixed Use - Landfill
Multi Family Residential
Office
Parks/Open Space
Privately Owned Non-Taxable
Single Family Residential
Vacant
General Study Area
Airport Property Boundary
City of Novato Boundary
County Boundary
Land Use Data Sources:
-Marin County Community Development Agency, Marin Countywide Plan, Adopted November 6, 2007.
-Novato General Plan, Adopted March 8, 1996.
-Sonoma County General Plan 2020, Adopted September 23, 2008.
0
3,000'
Environmental Impact Statement
Gnoss Field Airport
FINAL
12/19/2013 Prepared by Landrum & Brown
Filename: P:\DVO-Gnoss Field\GIS\MXD\EIS\EIS_Exhibits\EIS_Document 4-8_Future Land Use.mxd
Future Land Use
Exhibit: 4-8

Table 4-5
POPULATION AND PROJECTIONS
Gnoss Field Airport

AREA	2000 CENSUS	2008 CENSUS ESTIMATE	POPULATION PROJECTIONS		
			2010	2020	2030
State of California	33,871,648	36,756,666	38,067,134	42,206,743	46,444,861
9-County San Francisco Bay Area*	6,783,760	7,046,719	7,351,177	7,952,222	8,709,203
Marin County	247,289	248,794	253,682	260,305	273,151
Sonoma County	458,614	466,741	495,412	546,151	606,346
City of Novato	47,630	52,737	(Unavailable)*	66,400***	(Unavailable)

* Includes the counties of Marin, Sonoma, San Francisco, San Mateo, Napa, Alameda, Contra Costa, Solano, and Santa Clara. Marin County and Sonoma County are also listed separately in the table.

** The *Novato General Plan*, adopted March 8, 1996, projects approximately 27,000 households by 2015; the Plan also reports that the Association of Bay Area Governments projects a total of 25,750 households in Novato by the year 2010.

*** Population projection from the Association of Bay Area Governments as reported in the *Novato General Plan*, adopted March 8, 1996.

Sources: U.S. Census Bureau, on-line at www.census.gov. State of California, Department of Finance, *Population Projections for California and Its Counties 2000-2050,* Sacramento, California, July 2007. On-line at: http://www.dof.ca.gov/research/demographic/reports/projections/p-3/
Marin Countywide Plan, adopted November 6, 2007.

Table 4-6a
SHARE OF REGIONAL POPULATION BY COUNTY OF THE NINE-COUNTY SAN FRANCISCO BAY AREA
Gnoss Field Airport

COUNTY	TOTAL POPULATION (2008 ESTIMATE)	PERCENT SHARE OF POPULATION (2008 ESTIMATE)
Alameda	1,474,368	20.9%
Contra Costa	1,029,703	14.6%
Marin	248,794	3.5%
Napa	133,433	1.9%
San Francisco	808,976	11.5%
San Mateo	712,690	10.1%
Santa Clara	1,764,499	25.0%
Solano	407,515	5.8%
Sonoma	466,741	6.6%
Total	**7,046,719**	**100.0%**

Sources: U.S. Census Bureau on-line at www.census.gov, Landrum & Brown, 2009.

Exhibit 4-9, *Census Tracts in the GSA*, shows the census tracts within the GSA. Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations,* requires all Federal agencies to address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

The U.S. DOT Order 5610.2(a) defines a minority population as any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy, or activity. The U.S. DOT Order 5610.2(a) states Low-Income is a person whose median household income is at or below the Department of Health and Human Services (HHS) poverty guidelines. In 2012, the HHS poverty guideline level for a family of four was $23,050[16]. The U.S. DOT Order 5610.2(a) defines a Low-Income Population as any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy or activity. These definitions are discussed in more detail in Section 5.3.2.

Table 4-6b shows the percent minority population and median household income for the census tracts in the GSA and Marin County. The population of Marin County is 80 percent White, and 20 percent minorities. Within the GSA, census tract 1011, which includes DVO, has a five percent minority population. Census tracts 1012, 1021, and 1506.12 also have minority populations that are less than the 20 percent average minority population for Marin County. Census tract 1330 has a 22 percent minority population, slightly higher than the overall Marin County percentage of 20 percent minorities. The portion of census tract 1330 within the GSA consists of Olompali State Park and agricultural areas and has very few residences, so the total population and minority population within this portion of the GSA is very low. Census tract 1022.03 has a 33 percent minority population, as opposed to the 20 percent overall minority population for Marin County. However, only a small portion of census tract 1022.03 is within the GSA. This census tract evaluation shows that there is no readily identifiable minority population within the GSA of the Proposed Project.

The HHS poverty guideline level for a family of four was $23,050 in 2012. As shown in Table 4.6b, census tract 1011, which includes DVO, has a median income of $139,250. This is the highest median income level of any census tract in the GSA. All the other census tracts within the GSA had a median income level at least twice the HHS 2012 poverty level. There is no readily identifiable population of low-income persons in the GSA who live within geographic proximity of DVO.

[16] Office of the Assistant Secretary for Planning and Evaluation, Department of Health and Human Services, Prior HHS Poverty Guidelines and Federal Register References online at http://aspe.hhs.gov/poverty/figures-fed-reg.cfm accessed December 2013.

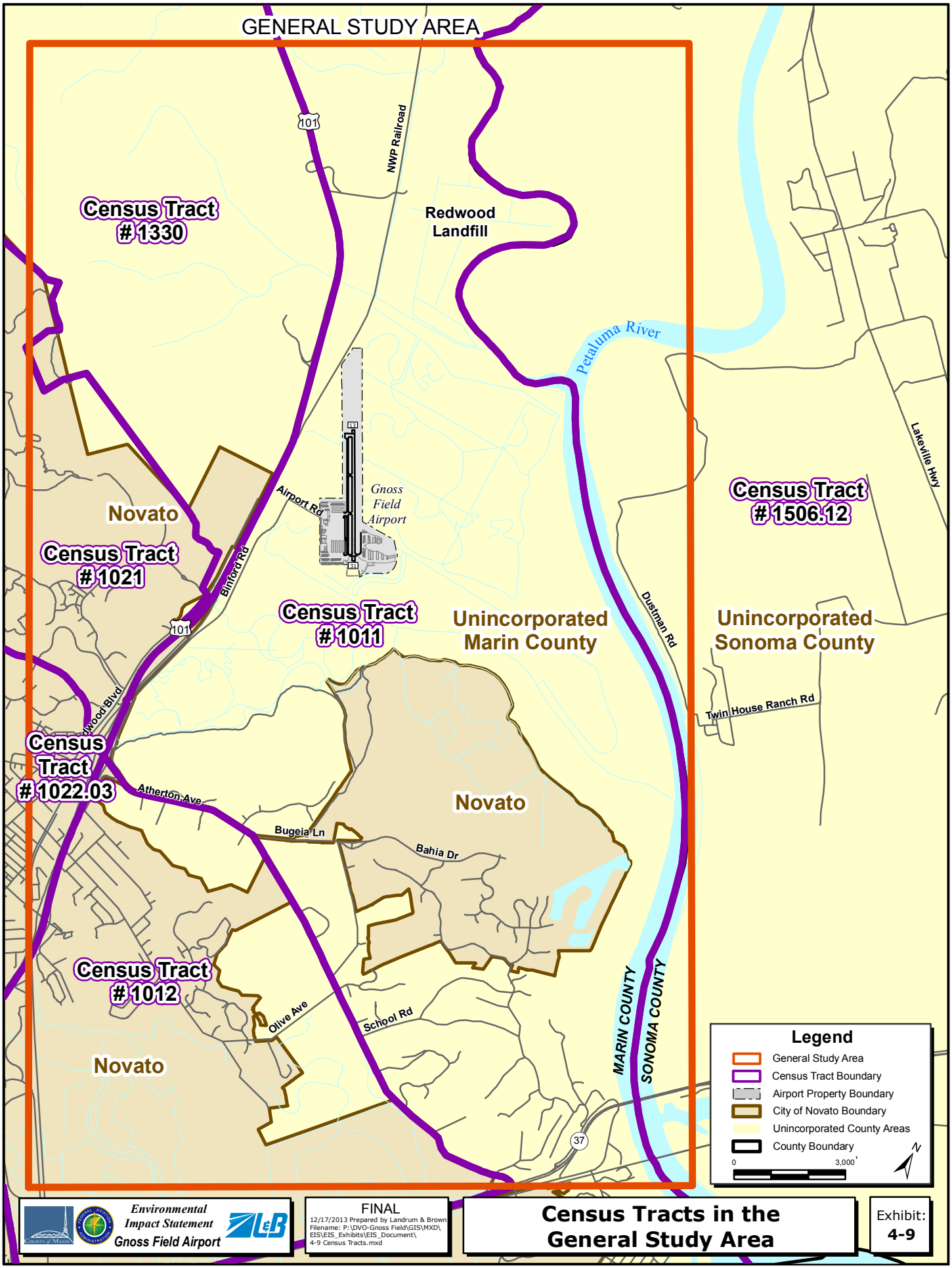
GENERAL STUDY AREA
Census Tract # 1330
Redwood Landfill
NWP Railroad
101
Petaluma River
Lakeville Hwy
Gnoss Field Airport
Airport Rd
Novato
Census Tract # 1021
Binford Rd
Census Tract # 1011
Unincorporated Marin County
Census Tract # 1506.12
Unincorporated Sonoma County
Dustman Rd
Twin House Ranch Rd
Census Tract # 1022.03
Atherton Ave
Bugeja Ln
Bahia Dr
Novato
Census Tract # 1012
Olive Ave
School Rd
Novato
MARIN COUNTY
SONOMA COUNTY
37
Legend
General Study Area
Census Tract Boundary
Airport Property Boundary
City of Novato Boundary
Unincorporated County Areas
County Boundary
0
3,000'
Environmental Impact Statement
Gnoss Field Airport
FINAL
12/17/2013 Prepared by Landrum & Brown
Filename: P:\DVO-Gnoss Field\GIS\MXD\EIS\EIS_Exhibits\EIS_Document\4-9 Census Tracts.mxd
Census Tracts in the General Study Area
Exhibit: 4-9

Table 4-6b
SOCIOECONOMIC AND ETHNIC COMPOSITION OF THE GSA
Gnoss Field Airport

Marin County		
	Median Income	**Percent Minority Population**
	$90,962	20%
General Study Area		
Census Tract	**Median Income**	**Percent Minority Population**
1011	$139,250	5%
1012	$65,398	18%
1021	$106,544	18%
1022.03	$53,819	33%
1330	$60,250	22%
1506.12	$95,694	11%

Source: Table S1903, U.S. Census Bureau, 2008-2012 American Community Survey, on-line at www.census.gov, Landrum & Brown, 2013.

Table 4-7, shows the pattern of workers commuting to Marin County from counties within the San Francisco Bay Area. In 2000, over 43,953 people (35.8 percent of the Marin County workforce) commuted to Marin County from outlying counties.[17] Over half of the work force (64.2 percent) commutes from within Marin County.

Table 4-7
DAILY COMMUTER TOTALS TO MARIN COUNTY
Gnoss Field Airport

ORIGINATING COUNTY	PERSONS COMMUTING TO MARIN COUNTY	PERCENT OF PERSONS COMMUTING TO MARIN COUNTY
Marin	78,681	64.2%
Sonoma	18,336	14.9%
San Francisco	6,450	5.3%
San Mateo	973	0.8%
Napa	894	0.7%
Alameda	3,745	3.1%
Contra Costa	6,803	5.5%
Solano	4,418	3.6%
Santa Clara	578	0.5%
All other areas outside Bay Area	1,756	1.4%
Total from outside Marin County	*43,953*	*35.8%*

Sources: *County to County Worker Flow Files*, 2007, US Census Bureau.
U.S. Census Bureau, 2000 Census Data, on-line at www.census.gov

[17] U.S. Census Bureau, *County to County Worker Flow Files*, 2007.

4.3.2 ECONOMIC GROWTH AND EMPLOYMENT

The City of Novato's labor force was 26,000 in 2009.[18] Major employers include the Fireman's Fund Insurance Company, the Buck Institute for Age Research, small biotech firms, such as Biosearch Technologies and BioMarin Pharmaceutical, and several small technology companies, including 2K Marin, Radiant Logic, Imagemovers Digital, and Sonic Solutions. The former Hamilton Air Force Base, decommissioned and closed in 1974, was designated a discontiguous Historic District in 1998.[19] Current uses of the former Hamilton site include parks, open space, wetlands, single family homes, office buildings, light industrial, and retail uses.[20] Today, the Hamilton Wetlands Restoration Project, led by the U.S. Army Corps of Engineers, the California State Coastal Conservancy, and the San Francisco Bay Conservation and Development Commission, is working to return the 988-acre former airfield and north antenna to their natural tidal wetland state, along with 1,600-acres of additional adjacent lands located in the Bel Marin Keys area.[21]

The workforce in Marin County has decreased from 137,700 in 2000 to 128,400 in 2007.[22] This reflects a seven percent decrease in the total number of Marin County resident workers. **Table 4-8** lists the most recent information available on industry sectors, and number of employees in each sector for the San Francisco-San Mateo-Redwood City Metropolitan Area (MA), which includes Marin County. The Service Providing sector compromises the largest share of workforce in the area. The largest growth has been in the Professional, Scientific and Technical Services sector with a 14.0 percent increase between 2003 and 2007. The most significant decrease has been in the number of people employed in the Durable Goods sector with a 40.0 percent decrease between 2003 and 2007.[23] **Table 4-9** highlights the top private employers in Marin County in 2009.

According to the California Employment Development Department, the occupations with the fastest projected job growth between 2006 and 2016 in the San Francisco-San Mateo-Redwood City MA are Biomedical Engineers, Network Systems and Data Communication Analysts, Medical Scientists and Biochemists. Biomedical Engineers has the largest projected percentage increase from 530 employees to 850 employees, approximately 60.0 percent.[24]

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[18] Labor Force and Unemployment Rate for Cities and Census Designated Places, *California Employment Development Department,* online at www.labormarketinfo.edd.ca.gov

[19] National Park Service. On-line at: http://www.nps.gov/nr/travel/aviation/ham.htm Retrieved September 30, 2013.

[20] *Novato General Plan*, adopted March 8, 1996.

[21] Hamilton Wetlands Restoration Project. On-line at: http://hamiltonwetlands.scc.ca.gov/ Retrieved October 8, 2013.

[22] Labor Force and Unemployment Rate for Cities and Census Designated Places, *California Employment Development Department,* online at www.labormarketinfo.edd.ca.gov

[23] *California Employment Development Department,* online at www.labormarketinfo.edd.ca.gov.

[24] Occupations with Fastest Job Growth (percent change), *California Employment Development Department,* online at www.labormarketinfo.edd.ca.gov

Table 4-8
ESTIMATED EMPLOYMENT BY SECTOR, SAN FRANCISCO-SAN MATEO-REDWOOD CITY METROPOLITAN AREA (INCLUDES MARIN COUNTY)
Gnoss Field Airport

SECTOR	2003	2004	2005	2006	2007	NET CHANGE 2003-2007
Service Providing	98,800	97,700	97,200	97,600	98,300	-0.5%
Trade, Transportation and Utilities	20,300	19,200	18,800	18,300	18,500	-8.8%
Professional and Business Services	17,700	18,600	18,500	19,600	19,700	11.2%
Retail Trade	16,200	15,100	14,900	14,300	14,500	-10.4%
Educational and Health Services	15,700	15,500	15,600	15,800	15,900	1.3%
Government	14,800	14,400	14,700	1,500	15,000	1.4%
Leisure and Hospitality	12,700	12,700	12,600	12,700	13,100	3.1%
Health Care, Social Assistance	12,500	12,300	12,400	12,600	12,500	0.0%
Local Government	12,100	11,700	1,200	12,300	12,400	2.5%
Goods Producing	11,600	11,200	11,000	10,400	10,500	-9.5%
Accommodation and Food Service	10,000	10,100	10,000	10,200	10,300	3.0%
Professional, Scientific and Technical Services	9,700	10,500	10,700	11,200	11,100	14.4%
Financial Activities	9,700	9,400	9,300	9,200	8,900	-8.2%
Finance and Insurance	6,900	6,500	6,500	6,400	6,300	-8.7%
Administrative and Support and Waste Services	6,100	6,100	5,600	6,100	6,400	4.9%
Other Services	4,700	4,900	4,600	4,800	4,900	4.3%
Information	3,300	3,300	3,100	2,200	2,400	-27.3%
Educational Services	3,200	3,100	3,200	3,100	3,300	3.1%
Manufacturing	3,100	2,600	2,500	2,400	2,100	-32.3%
Real Estate and Rental and Leasing	2,800	2,900	2,800	2,800	2,600	-7.1%
Wholesale Trade	2,800	2,800	2,600	2,700	2,800	0.0%
Arts, Entertainment, and Recreation	2,600	2,600	2,600	2,500	2,700	3.8%

Table 4-8, Continued
ESTIMATED EMPLOYMENT BY SECTOR, SAN FRANCISCO-SAN MATEO-REDWOOD CITY METROPOLITAN AREA (INCLUDES MARIN COUNTY)
Gnoss Field Airport

SECTOR	2003	2004	2005	2006	2007	NET CHANGE 2003-2007
State Government	1,800	1,800	1,800	1,800	1,900	5.5%
Nondurable Goods	1,600	1,300	1,300	1,200	1,200	-25.0%
Durable Goods	1,500	1,300	1,200	1,200	900	-40.0%
Transportation, Warehousing and Utilities	1,400	1,300	1,400	1,300	1,200	-14.2%
Federal Government	900	900	900	900	700	-22.2%
Total Farm	600	700	600	700	600	0.0%
Total	307,000	302,500	289,800	288,100	302,900	-1.3%

Note: Column totals might not sum due to rounding.
Source: *California Employment Development Department,* online at www.labormarketinfo.edd.ca.gov.

Table 4-9
TOP PRIVATE EMPLOYERS IN MARIN COUNTY IN 2009
Gnoss Field Airport

COMPANY	NATURE OF BUSINESS	LOCAL FULL-TIME EMPLOYMENT
Kaiser Permanente	Health Care	1,311
Autodesk	Software Developer	1,028
Marin General Hospital	Health Care	975
Fireman's Fund Insurance	Insurance	947
BioMarin Pharmaceutical	Pharmaceutical	632
Comcast	Telecommunications	619
Safeway	Grocery Retailer	452
Macy's	Department Store	445
Dominican University	Education	370
MHN	Health Care	350
Guide Dogs for the Blind	Nonprofit	287
Brayton Purcell, LLP	Legal	275
Mollie Stones Market	Grocery Retailer	270
Wells Fargo Bank	Financial	265
Cotsco Wholesale	Retail	260
Kentfield Rehabilitation & Specialty Hospital	Health Care	229
W. Bradley Electric, Inc.	Electrical	227
Novato Community Hospital	Health Care	225
Ghilotti Bros, Inc.	Construction	224
Lucasfilm	Film Production	220
Longs Drugs	Drugstore	217
Nordstrom	Department Store	211
Coldwell Banker	Real Estate	207
Bank of Marin	Banking	200

Source: North Bay Business Journal *Private Sector Employers, Marin County* 2009 accessed on-line at http://lists.northbaybusinessjournal.com

4.4 AIR QUALITY

The assessment of airport air quality for an environmental review prepared pursuant to the NEPA is required to follow the procedures established by the FAA's *Air Quality Procedures for Civilian Airports & Air Force Bases*.[25] The procedures require the assessment of the existing conditions to determine the contribution of airport operations to the local air quality and the potential impact to the community.

This section contains a discussion of existing air quality conditions in the Marin County area and includes a summary of relevant air quality topics and airport-related emissions sources.

4.4.1 AIR QUALITY STATUS OF MARIN COUNTY

For Federal air quality standards, Marin County is included in the San Francisco Bay Intrastate Air Quality Control Region.[26] The region does not currently meet the Federal eight-hour standard for healthful levels of ozone and has been designated by the U.S. Environmental Protection Agency (USEPA) as a marginal nonattainment area for ozone.[27] Ozone is not directly emitted from a source. Rather, ozone is formed through photochemical reactions involving emissions of the precursor pollutants Nitrogen Oxides (NO_x) and Volatile Organic Compounds (VOC) in the presence of abundant sunlight and heat. Therefore, emissions of ozone on a project level are evaluated based on the rate of emissions of the ozone precursor pollutants, NO_x, and VOC.

Further, USEPA has determined the County exceeds the 24 hour standard for emissions of fine particulate matter ($PM_{2.5}$). In the past Marin County was designated as nonattainment for carbon monoxide (CO) but in April 1998 the Bay Area was redesignated to attainment and now operates under a maintenance plan in order to prevent emissions from reaching an unhealthy level. **Table 4-10** summarizes Marin County's compliance status with Federal air quality standards. For more information on the Federal air quality standards and Marin County's status, see Appendix F, *Air Quality*.

Marin County is also located within the Bay Area Air Quality Management District (BAAQMD) of California. California maintains more stringent standards than the USEPA for which the County must adhere called the California Ambient Air Quality Standards. Marin County has been designated by the BAAQMD as nonattainment for the eight-hour and one-hour standards for ozone, the annual arithmetic mean and the twenty four-hour standards for coarse particulate matter (PM_{10}), and the annual arithmetic mean standard for $PM_{2.5}$.[28]

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[25] *Air Quality Procedures for Civilian Airports & Air Bases*, April 1997; and Addendum, September 2004.

[26] USEPA, Title 40 CFR Part 81, § 81.21, *San Francisco Bay Intrastate Air Quality Control Region*, January 16, 1981.

[27] USEPA website, http://www.epa.gov/oar/oaqps/greenbk, accessed October 8, 2013.

[28] BAAQMD website, http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm, accessed October 8, 2013.

Table 4-10
FEDERAL AIR QUALITY STATUS IN MARIN COUNTY
Gnoss Field Airport

POLLUTANT	AVERAGING PERIOD	ATTAINMENT STATUS
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	Attainment
	24-Hour Average	
	3-Hour Average	
Particulate Matter (PM_{10})	24-Hour Average	Attainment
Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean (1997 Std)	Attainment
	24-Hour Average (2006 Std)	Non-attainment
Carbon Monoxide (CO)	8-Hour Average	Maintenance plan
	1-Hour Average	
Ozone (O_3)	8-Hour Average (2008 Std)	Non-attainment
	1-Hour Average (revoked)	revoked
Nitrogen Dioxide (NO_2)	1-Hour Daily Maximum	Attainment
	Annual Arithmetic Mean	
Lead (Pb)	Rolling 3-Month Average	Attainment
	3-Month Arithmetic Mean	

Notes: Std is Standard.
Sources: USEPA and BAAQMD, 2011.

4.4.2 ASSESSMENT OF EXISTING CONDITIONS (2008)

An emission inventory was prepared using 2008 data, which is representative of existing conditions, using the FAA Emissions and Dispersion Modeling System (EDMS), version 5.1. The EDMS computer program is the FAA-required and USEPA-approved model for estimating emissions and calculating pollutant concentrations from airport-specific sources. The model estimates the rate of emissions of the criteria and precursor pollutants in tons per year. The assumptions used in the emissions inventory and the methodology used to develop this air quality assessment are provided in Appendix F.

4.4.3 CRITERIA AND PRECURSOR POLLUTANT EMISSION INVENTORY

The results of the emission inventory are provided in **Table 4-11**. The approximately 266 annual tons of all emissions are comprised primarily of CO emissions. The greatest overall emission contribution comes from aircraft operations. Emissions of Lead (Pb), PM_{10} and $PM_{2.5}$ are also produced primarily by aircraft engines. The largest contributor of CO in the inventory is from aircraft operations.

Table 4-11
CRITERIA AND PRECURSOR POLLUTANT EMISSION INVENTORY
EXISTING CONDITIONS (2008)
Gnoss Field Airport

EMISSION SOURCES	ANNUAL EMISSIONS (tons per year)						
	CO	**VOC**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**Pb**
Aircraft	147.50	10.70	1.04	0.41	9.54	9.54	0.11
GSE	0.69	0.16	1.14	0.04	0.03	0.03	NA
GAV in Parking Facilities	0.32	0.04	0.04	0.00	0.00	0.00	NA
GAV on Roadways	0.26	0.02	0.04	0.00	0.00	0.00	NA
Stationary Sources	0.52	17.08	1.22	0.00	0.05	0.05	NA
TOTAL	**149.30**	**28.00**	**3.48**	**0.46**	**9.62**	**9.62**	**0.11**

Key:

CO: Carbon Monoxide
VOC: Volatile Organic Compounds
NOx: Nitrogen Oxides
SOx: Sulfur Oxides
PM10: Course particulate matter
PM2.5: Fine particulate matter
Pb: Lead
GSE: Ground Support Equipment, which includes the Airport's two fuel trucks
GAV: Ground Access Vehicles

Source: EDMS ver. 5.1 L&B Analysis, 2009

4.4.4 CLIMATE CHANGE AND GREENHOUSE GAS EMISSIONS

Research has shown there is a direct correlation between fuel combustion and Greenhouse Gas (GHG) emissions. In terms of U.S. contributions, the General Accounting Office (GAO) reports that "domestic aviation contributes about three percent of total carbon dioxide emissions, according to EPA data," compared with other industrial sources including the remainder of the transportation sector (20 percent) and power generation (41 percent).[29] The International Civil Aviation Organization (ICAO) estimates that GHG emissions from aircraft account for roughly three percent of all anthropogenic GHG emissions globally.[30] Climate change due to GHG emissions is a global phenomenon, so the affected environment is the global climate.[31]

[29] GAO Report to Congressional Committees, *Aviation and Climate Change,* 2009.
[30] Alan Melrose, "European ATM and Climate Adaptation: A Scoping Study," in *ICAO Environmental Report.* (2010).
[31] As explained by the U.S. Environmental Protection Agency, "greenhouse gases, once emitted, become well mixed in the atmosphere, meaning U.S. emissions can affect not only the U.S. population and environment but other regions of the world as well; likewise, emissions in other countries can affect the United States." Climate Change Division, Office of Atmospheric Programs, U.S. Environmental Protection Agency, *Technical Support Document for Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act* 2-3 (2009).

The scientific community is continuing efforts to better understand the impact of aviation emissions on the global atmosphere. The FAA is leading and participating in a number of initiatives intended to clarify the role that commercial aviation plays in GHG emissions and climate. The FAA, with support from the U.S. Global Change Research Program and its participating Federal agencies (e.g., NASA, NOAA, EPA, and DOE), has developed the Aviation Climate Change Research Initiative (ACCRI) in an effort to advance scientific understanding of regional and global climate impacts of aircraft emissions. FAA also funds the Partnership for Air Transportation Noise & Emissions Reduction (PARTNER) Center of Excellence research initiative to quantify the effects of aircraft exhaust and contrails on global and U.S. climate and atmospheric composition. Similar research topics are being examined at the international level by the International Civil Aviation Organization.[32]

4.4.5 HAZARDOUS AIR POLLUTANTS

Hazardous air pollutants (HAP) are gaseous organic and inorganic chemicals, compounds, and particulate matter that may be carcinogenic (known or suspected to cause cancer) or non-carcinogenic (known or suspected to cause other adverse health effects). These substances are believed to cause unique exposure risks because of the innate toxicity of each substance. The 188 substances listed in the Clean Air Act (CAA) Section 112 have a variety of toxic effects causing major health concerns relating to, among others, the nervous and reproductive systems, and lung and liver diseases.

The health effects from exposure to HAPs in the ambient air are influenced by the regional meteorology. Higher winds have a tendency to dilute the vaporized pollutants downwind but may also increase the volatilization rate of some liquids.[33] Greater wind speeds may also increase the concentration of nonvolatile contaminants absorbed and adsorbed[34] to soil and dust. Atmospheric instability, which relates to vertical motions in the air, may increase the dispersion of contaminants throughout various vertical levels whereas downwind contaminant concentrations are usually higher when stable atmospheric conditions exist. Precipitation reduces overall airborne contaminants by removing the particles from the air and volatile contaminants emit at lower rates from wet soil than from dry soil. In addition, solar radiation and temperature can also affect the volatilization of liquids. When considering the parameters that affect the formation and dispersion of HAPs, it is clear that health effects from HAP emissions is appropriately assessed on a regional level and not confined to a project-level analysis of a single source.

An evaluation of HAP emissions due to airport projects is not required under NEPA or by the provisions of CAA, including the 1990 Amendments, and the USEPA has not established National Ambient Air Quality Standards for any HAP. However, an inventory of HAP was requested during air quality scoping meetings with the EPA

[32] Lourdes Q. Maurice and David S. Lee. *Chapter* 5: *Aviation Impacts on Climate.* Final Report of the International Civil Aviation Organization (lCAO) Committee on Aviation and Environmental Protection (CAEP) Workshop. October 29th November 2nd 2007, Montreal.

[33] Keith, Lawrence H., et al., Handbook of Air Toxics – Sampling, Analysis, and Properties, 1995.

[34] A substance that is attracted to a surface and remains concentrated on the surface is adsorbed, whereas absorption occurs when the substance is not only retained on the surface but also passes through the surface to become distributed throughout.

and BAAQMD. The HAP inventory (Appendix F) includes a project-level emission inventory of selected HAPs based on the criteria and precursor pollutant emission inventory prepared to satisfy other regulatory requirements for the air quality assessment. The HAP inventory is provided for disclosure purposes only and should not be relied on as an interpretation of health risks, should not be compared to other sources of HAPs in the region, or compared to HAP emissions reported for other airports.

4.5 WATER RESOURCES

This section addresses existing water resources with respect to surface water and ground water as they relate to the DSA.

4.5.1 SITE HYDROLOGY

DVO lies within the original flood plain of the Petaluma River at sea level. It was built in an area of reclaimed salt water tidal marshlands that are part of the formerly extensive salt marshes present around the northwest corner of San Pablo Bay, characterized by muds and clays found in marshes, swamps, and waterways. The area comprises an element of the extensive wetlands associated with San Francisco Bay, which once formed the largest contiguous tidal marsh system present on the Pacific Coast of North America.[35,36,37]

The area north of DVO is drained by San Antonio Creek and Black John Slough is located immediately south of the site, as shown on **Exhibit 4-10, *Jurisdictional Wetlands and Waters of the U.S.***, and also on **Exhibit 4-11, *Floodplains***. Both of these features are tributary to the Petaluma River, which flows into San Pablo Bay at the north end of San Francisco Bay. Surface waters on the site are fed by precipitation, overland flow, and seeps. The seeps occur primarily in the northwestern corner of the Airport, and are fed by shallow subsurface flow from the foothills of Burdell Mountain, which is located to the west. Water flows off of Airport property via a system of ditches, canals, and sloughs and is pumped over two sets of levees into the Petaluma River. Levees were first constructed along the Petaluma River to reclaim the area between the hills to the west and the Petaluma River for agriculture. The levees that protect the Airport are located west of the original levee along the Petaluma River. The two sets of levees are shown on Exhibit 4-9, *Jurisdictional Wetlands and Waters of the U.S.*, and also on Exhibit 4-10, *Floodplains*. Because the Airport site is protected by these levees, the water level fluctuations at the site are more similar to a reservoir than to a typical estuary. There is virtually no influence of tidal action on the hydrologic regime.

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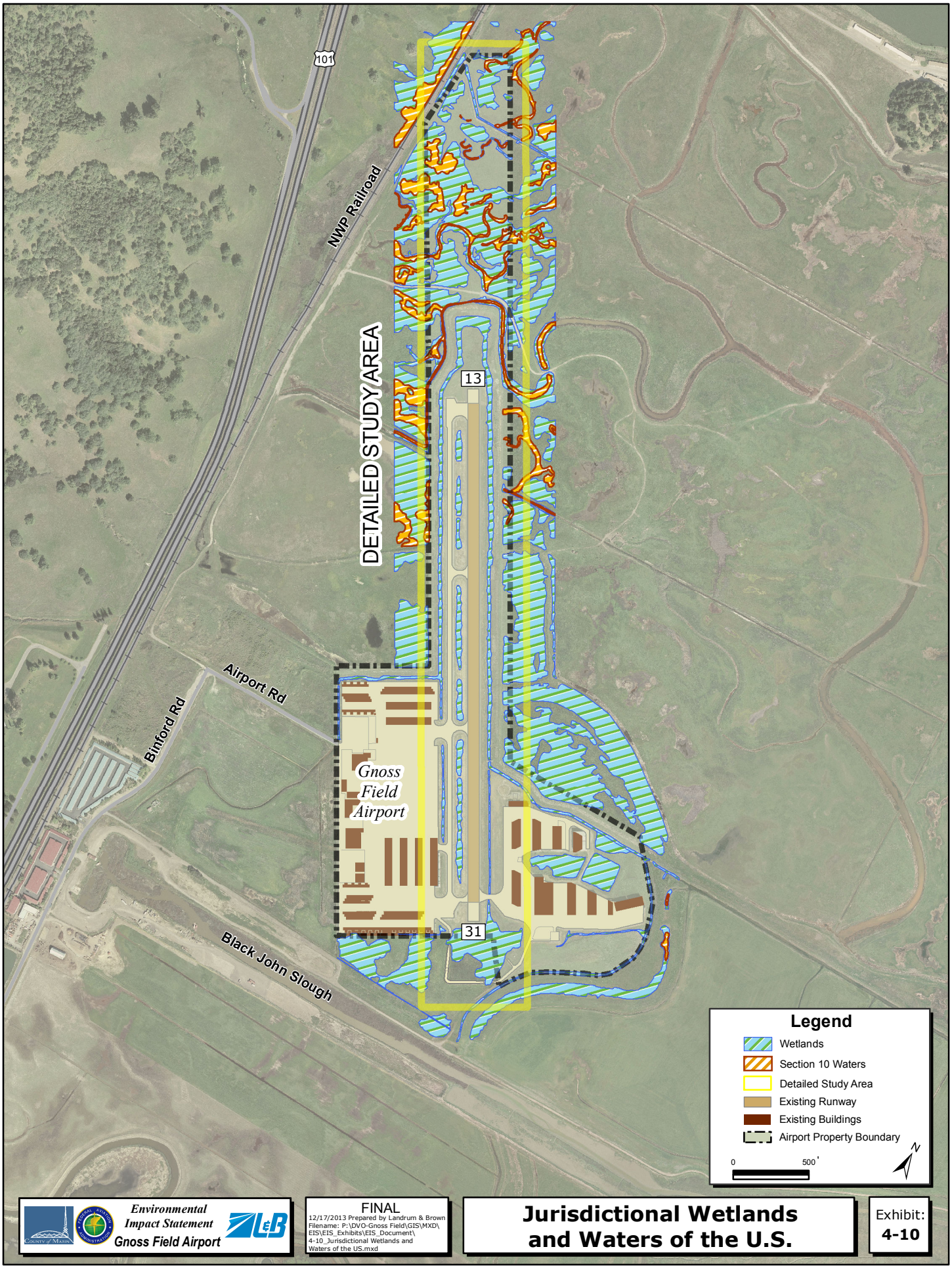
35 Conomos, T.J. (Editor), 1979, *San Francisco Bay: the Urbanized Estuary*. Pacific Division, American Association for the Advancement of Science, San Francisco, California.

36 Josselyn, Michael, 1983, *The Ecology of San Francisco Bay Tidal Marshes: A Community Profile*. Report No. FWS/OBS-83/23, U.S. Fish and Wildlife Services, Division of Biological Services, Washington, D.C.

37 Nichols, D.R. and N.A. Wright, 1972, *Preliminary Map of Historic Margins of Marshlands, San Francisco Bay, California*. U.S. Geological Survey Open-File Map 71-216.



Environmental Impact Statement
Gnoss Field Airport

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12/17/2013 Prepared by Landrum & Brown
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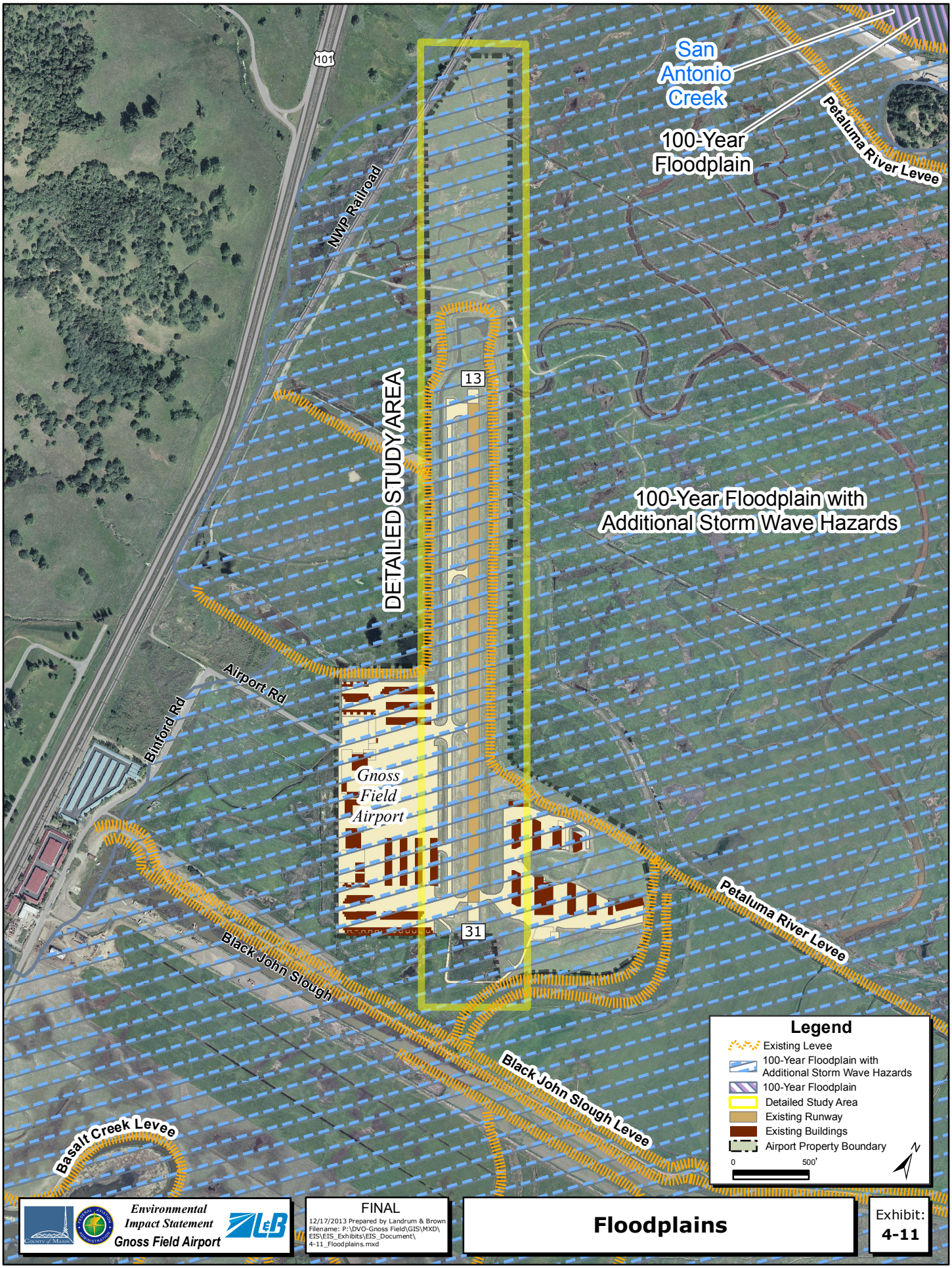
Jurisdictional Wetlands and Waters of the U.S.

Exhibit: **4-10**



Environmental Impact Statement
Gnoss Field Airport

FINAL

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Floodplains

Exhibit: **4-11**

4.5.2 WETLANDS AND OTHER WATERS OF THE U.S.

Wetlands located within the DSA were delineated as part of this environmental analysis. The U.S. Army Corps of Engineers (USACOE) issued a jurisdictional determination letter and map in August 2009 stating concurrence with the Gnoss Field Airport Delineated Waters of the U.S., as submitted to the USACOE by Marin County in March 2009, and as verified by the USACOE during a site visit in June 2009. See Appendix J, *Wetlands* for a copy of the USACOE jurisdictional letter and map. Wetland communities in the DSA include depressional seasonal wetlands, riverine seasonal wetlands, slope seep wetlands, high brackish marsh wetlands, perennial drainage and ditches/canals totaling 74.70 acres (see Exhibit 4-9, *Jurisdictional Wetlands and Waters of the U.S.)*.

Approximately 78.9 percent (58.96 acres) of the delineated wetlands are high brackish marsh wetlands. High brackish marsh plant communities consist of emergent species that are tolerant of both salt and occasional inundation. They are typically found above Mean High Water and may only be inundated by storm tides or found on the landward side of levees where the salinity is still high enough to discourage plants that can only exist in freshwater marshes.

A total of 3.59 acres of depressional seasonal wetlands have been delineated within the DSA. Depressional seasonal wetlands exhibit a hydrologic regime dominated by saturation, rather than inundation. Depressional seasonal wetlands were identified on the site as depressions within the topography with a hydrologic regime dominated by saturation and capable of supporting hydrophytic plant species and hydric soils. Plant species in depressional seasonal wetlands are adapted to withstand short periods of saturation or saturated soils conditions but will not withstand prolonged periods of inundation, as is common in vernal pools.

A total of 0.52 acres of riverine seasonal wetlands has been delineated within the DSA. Riverine seasonal wetlands are defined by a hydrologic regime dominated by unidirectional flow of water. Riverine seasonal wetlands typically occur in topographic folds or swales and represent natural drainages that convey sufficient water to support wetland vegetation. Riverine seasonal wetlands typically convey water during and shortly after storm events. Riverine seasonal wetlands may have a moderately defined bed and bank and often exhibit sufficient gradient to convey water off of the site. As in depressional seasonal wetlands, plant species found within riverine seasonal wetlands are typically adapted to a hydrologic regime dominated by saturation rather than inundation.

A total of 2.95 acres of seep have been delineated within the DSA. Seeps are characterized as areas where groundwater intersects with the soil surface. Typically, flow from seeps continues for some period after the rainy season and may continue all year. Seeps can support isolated wetland vegetation (such as on a hillside) or they may form the headwaters of a riverine seasonal wetland or other jurisdictional drainage feature. Vegetation in seeps often consists of plant species associated with seasonal and perennial marsh habitats. When seeps flow for only short periods beyond the rainy season and into the warm season, herbaceous perennial wetland species typically dominate. Seeps that persist for longer periods may support woody, perennial, wetland obligate species.

A total of 2.48 acres of perennial drainage have been delineated within the DSA. Perennial drainages are features that may not meet the three-parameter criteria for vegetation, hydrology and soils but do convey water and exhibit an "ordinary high water mark". Perennial drainages generally convey unidirectional water flows throughout the entire year. Perennial drainages typically consist of a channel, bed and bank and are devoid of vegetation due to the scouring effect of flowing water. Perennial drainages are often bordered by wetland vegetation communities of various composition and cover depending on flow rates, duration of flows and soil types.

A total of 6.20 acres of ditches have been delineated within the DSA. Ditches excavated in upland areas and draining entirely uplands are not typically considered within Clean Water Act (CWA) jurisdiction by the USACOE. However, the ditches on the site typically drain at least some wetland areas and often connect to wetland features. Therefore, the ditches on the site are considered within CWA jurisdiction.

A summary of wetlands in the DSA is included in **Table 4-12**.

Table 4-12
SUMMARY OF CLEAN WATER ACT JURISDICTIONAL FEATURES AND WETLANDS AT GNOSS FIELD AIRPORT

CLASSIFICATION	TOTAL ACREAGE	JURISDICTIONAL ACREAGE	WIDTH (IN FEET)	LENGTH (IN FEET)
Depressional Seasonal Wetland	3.59	3.59	n/a	n/a
Riverine Seasonal Wetland	0.52	0.52	n/a	n/a
Slope Seep Wetland	2.95	2.95	n/a	n/a
High Brackish Marsh Wetland	58.96	58.96	n/a	n/a
Perennial Drainage	2.48	2.48	145	2,739
Ditch/Canal	6.20	6.20	140	17,446
Total	74.70	74.70	285	20,185

Source: CWA Jurisdictional Determination for Gnoss Field Airport, Correspondence from the U.S. Army Corps of Engineers to the Marin County Department of Public Works, Received August 27, 2009. See Appendix J.

4.5.3 FLOODPLAINS

Executive Order *11988, Floodplain Management,* directs Federal agencies to take action to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural beneficial values of floodplains. The Executive Order defines floodplains as the "lowland and relatively flat areas adjoining inland and coastal waters, including flood prone areas of offshore islands, including at a minimum, those that are subject to a one percent or greater chance of flooding in any given year".[38] The 100-year flood (one percent annual chance) has been adopted by the Federal Emergency Management Agency (FEMA) as the base flood for floodplain management purposes.

DOT Order 5650.2, *Floodplain Management and Protection*, states that all airport development actions must avoid the floodplain if a practicable alternative exists. If no practicable alternative exists, actions in a floodplain must be designed to minimize adverse impact to the floodplain's natural and beneficial values. The design must also minimize the potential risks for flood-related property loss and impacts on human safety, health, and welfare.[39]

The Flood Management Branch of the California Department of Water Resources administers programs aimed at reducing the threat of loss of life and damage to property through the encouragement and use of nonstructural alternatives and practices. The Branch coordinates with Federal, state and local agencies and provides planning assistance to state agencies on the placement of their facilities and conducting their programs to minimize the risk of flood loss and damage. The Branch coordinates all activities related to the state's participation in the National Flood Insurance Program; and facilitates problem resolution of California communities' compliance with the National Flood Insurance Program. There are various laws and programs designed to reduce the impact of flood waters on the Central Valley area of California, but none of those place additional requirements on this project.[40]

The Marin Countywide Plan provides guidance and recommendations regarding development within floodplains in order to protect people and property from risks associated with flooding and inundation within the County. Notably, Policy EH 3.2, Retain Natural Conditions, ensures that flow capacity is maintained in stream channels and floodplains, and achieves flood control using biotechnical techniques instead of storm drains, culverts, riprap, and other forms of structural stabilization.[41] Additional detail is available in the Marin Countywide Plan including specific goals and implementing programs.

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[38] Executive Order 11988, *Floodplain Management*, May 24, 1977. Available online at http://www.epa.gov/owow/wetlands/regs/eo11988.html Accessed October 8, 2013.

[39] DOT Order 5650.2, *Floodplain Management and Protection*, April 23, 1979. Available online at: http://isddc.dot.gov/OLPFiles/DOT/007652.pdf Accessed October 8, 2013

[40] *California Department of Water Resources, Flood Management*, On-line at: http://www.water.ca.gov/floodmgmt/lrafmo/fmb/ Retrieved October 8, 2013.

[41] *Marin Countywide Plan, 2.6, Environmental Hazards*. Adopted by the Marin County Board of Supervisors, November 6, 2007.

A Flood Insurance Rate Map (FIRM) prepared by FEMA (May 4, 2009)[42] was used to establish the boundary of the 100-year floodplain within the DSA. FIRM Community Panel and Marin County data show that the entire DSA lies within the FEMA designated "100-year Floodplain with Additional Storm Wave Hazards," also known as "Area of Special Flood Hazard Zone VE", which describes high-risk coastal areas with an annual one percent or greater chance of flooding and an additional hazard associated with storm waves,[43] as shown in Exhibit 4-10, *Floodplains*.

A system of manmade ditches and levees constructed along the Petaluma River provide some flood protection for the Airport. In addition, a second system of manmade ditches and levees has been constructed surrounding the runway to provide protection from flooding. While both of these systems provide protection from flooding, the exact level of flood protection has not been calculated.

4.6 DEPARTMENT OF TRANSPORTATION SECTION 4(f) RESOURCES AND LAND AND WATER CONSERVATION ACT, SECTION 6(f) RESOURCES.

The Federal statute that governs impacts in this category is commonly known as the DOT Act Section 4(f) provisions. Section 4(f) of the DOT Act, which is codified and renumbered as section 303(c) of 49 U.S.C., provides that the Secretary of Transportation will not approve any program or project that requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance, or land from an historic site of national, State, or local significance as determined by the officials having the jurisdiction thereof, unless there is no feasible and prudent alternative to the use of such land and such program, and the project includes all possible planning to minimize harm resulting from the use.

Section 6(f) of the Land and Water Conservation Fund (LWCF), 16 United States Code § 4601 et. seq. provides funds for buying or developing public use recreational lands through grants to local and state governments. LWCF Section 6(f)(3) prevents conversion of lands purchased or developed with LWCF to non-recreation uses unless the conversion is approved by the Secretary of Interior acting through the National Park Service. No LWCF lands would be converted to non-recreational use as a result of any of the alternatives proposed in this EIS. Therefore, LWCF Section 6(f) lands are not discussed further in this EIS.

[42] Federal Emergency Management Agency, *Flood Insurance Rate Map,* Community Number 0601730175D. Available online at: https://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1 Accessed October 8, 2013.

[43] *Definitions of FEMA Flood Zone Designations*, On-line at: http://msc.fema.gov Retrieved October 8, 2013.

Portions of one public park/recreation facility, the Burdell Unit of the Petaluma Marsh Wildlife Area, are located within the DSA. There are 18 public parks/recreational/historic facilities, open space preserves, and wildlife areas located partially or wholly within the GSA, as listed below and shown in **Exhibit 4-12, *Public Parks, Historic, and Recreational Facilities***, that would be considered Section 4(f) resources. The facilities and preserves located within the GSA fall under the jurisdiction of the State of California, Marin County, and the City of Novato are listed below.

- Park/Recreational/Historic Facility
  - Rancho Olompali State Historic Park, State of California
  - Hamman Field, City of Novato, California
  - Slade Park, City of Novato, California
  - Pansy Tong Lo Park, City of Novato, California
  - Bahia Mini Parks (3 sites), City of Novato, California
  - Black Point Boat Launch, Marin County, California
- Open Space Preserve
  - Mount Burdell, Marin County, California
  - Rush Creek, Marin County, California
  - Deer Island, Marin County, California
- Wildlife Area
  - Petaluma Marsh Wildlife Areas:
    - Petaluma River Unit, State of California
    - Burdell Unit, State of California
    - Black John Slough Unit, State of California
    - Rush Creek Unit, State of California
    - Bahia Wetlands Unit, State of California
    - Green Point Unit, State of California
    - Novato Creek Unit, State of California

4.7 HISTORIC, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

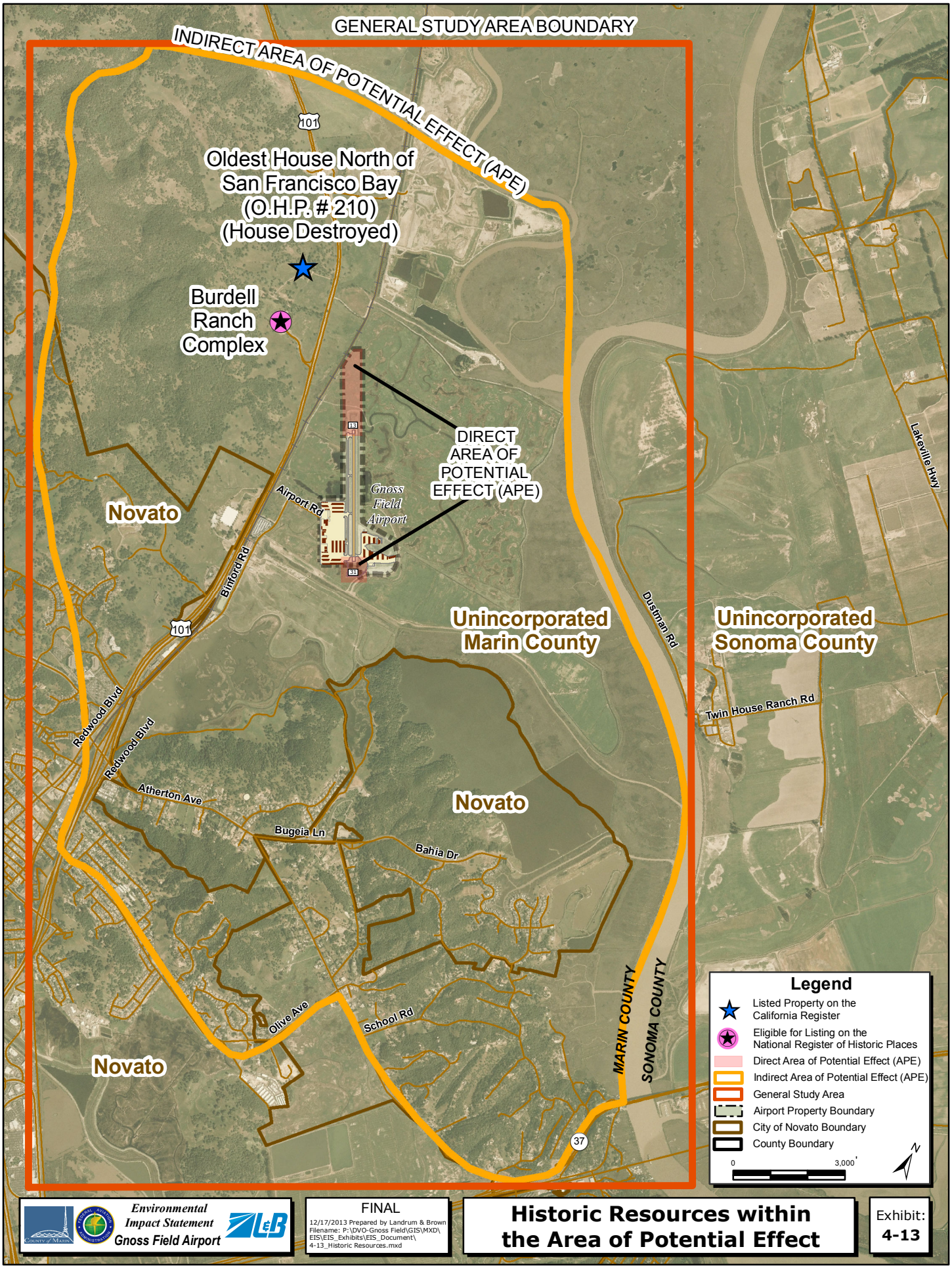
In accordance with the National Historic Preservation Act, Section 106, the FAA as the lead Federal agency for this EIS prepared documentation regarding the definition of the Area of Potential Effect (APE) and the identification of historic properties within the APE. The FAA sent letters to tribal groups requesting they identify any concerns regarding the proposed project, and at the request of the Federated Indians of Graton Rancheria, also met with the tribe regarding the proposed project. While developing the APE, the FAA considered both direct and indirect impacts to historic properties. Direct impacts would include direct and physical disturbance of historic properties. For this undertaking, direct impacts could occur within the area of ground disturbance. Indirect impacts would include impacts to historic properties associated with noise, visual impacts, or changes in setting. As a result of this effort the FAA defined two APEs - a Direct APE, where direct effects of the proposed project might occur, and an Indirect APE, where the indirect effects of the proposed project might occur. The boundary of the Indirect APE was determined after tribal consultation with the Federated Indians of Graton Rancheria. The California State Historic Preservation Office (SHPO) concurred with the APEs via letter on July 20, 2010 (see Appendix H, *Cultural Resources*

As shown on **Exhibit 4-13, *Historic Resources within the Area of Potential Effect***, the Direct APE is comprised of two areas, totaling just over 39 acres (the northern portion totals 28.24 acres and the southern portion totals 11.04 acres), which represents the area of potential direct impacts as a result of the undertaking (Proposed Project) and other reasonable alternatives. The Indirect APE is an irregularly-shaped area, totaling approximately 8,669 acres, which represents the area of potential indirect impacts as a result of the undertaking (Proposed Project) and other reasonable alternatives. By e-mails of July 25, 2011, the California SHPO requested a determination of the depth of ground disturbance associated with the proposed project and direct APE, and the FAA responded that the depth of ground disturbance is anticipated to be up to three feet.[44]

There are no historic properties located within the Direct APE that are listed or eligible for listing on the National Register of Historic Places (NRHP) or state register of historic places. The Olompali Burdell Ranch Complex, located in the Indirect APE, is eligible for listing on the NRHP. The site of The Oldest House North of San Francisco Bay, California Register of Historic Resources, California State Historic Landmark, Marin County, #210, is within the Indirect APE, but is not eligible for NRHP listing because the house was previously destroyed by fire.[45] (See Exhibit 4-13, *Historic Resources within the Area of Potential Effect).*

[44] Letter from Federal Aviation Administration to California State Historic Preservation Office, October 6, 2011 (see Appendix H for copy of letter).

[45] California State Historical Landmarks in Marin County, Retrieved October 15, 2011, on-line at: http://ceres.ca.gov/geo_area/counties/Marin/landmarks.html


GENERAL STUDY AREA BOUNDARY
INDIRECT AREA OF POTENTIAL EFFECT (APE)
101
Oldest House North of San Francisco Bay (O.H.P. # 210) (House Destroyed)
Burdell Ranch Complex
DIRECT AREA OF POTENTIAL EFFECT (APE)
Gnoss Field Airport
Airport Rd
Novato
Binford Rd
101
Unincorporated Marin County
Dutman Rd
Unincorporated Sonoma County
Lakeville Hwy
Twin House Ranch Rd
Redwood Blvd
Redwood Blvd
Atherton Ave
Novato
Bugeia Ln
Bahia Dr
Olive Ave
School Rd
Novato
MARIN COUNTY
SONOMA COUNTY
37
Legend
Listed Property on the California Register
Eligible for Listing on the National Register of Historic Places
Direct Area of Potential Effect (APE)
Indirect Area of Potential Effect (APE)
General Study Area
Airport Property Boundary
City of Novato Boundary
County Boundary
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Environmental Impact Statement
Gnoss Field Airport
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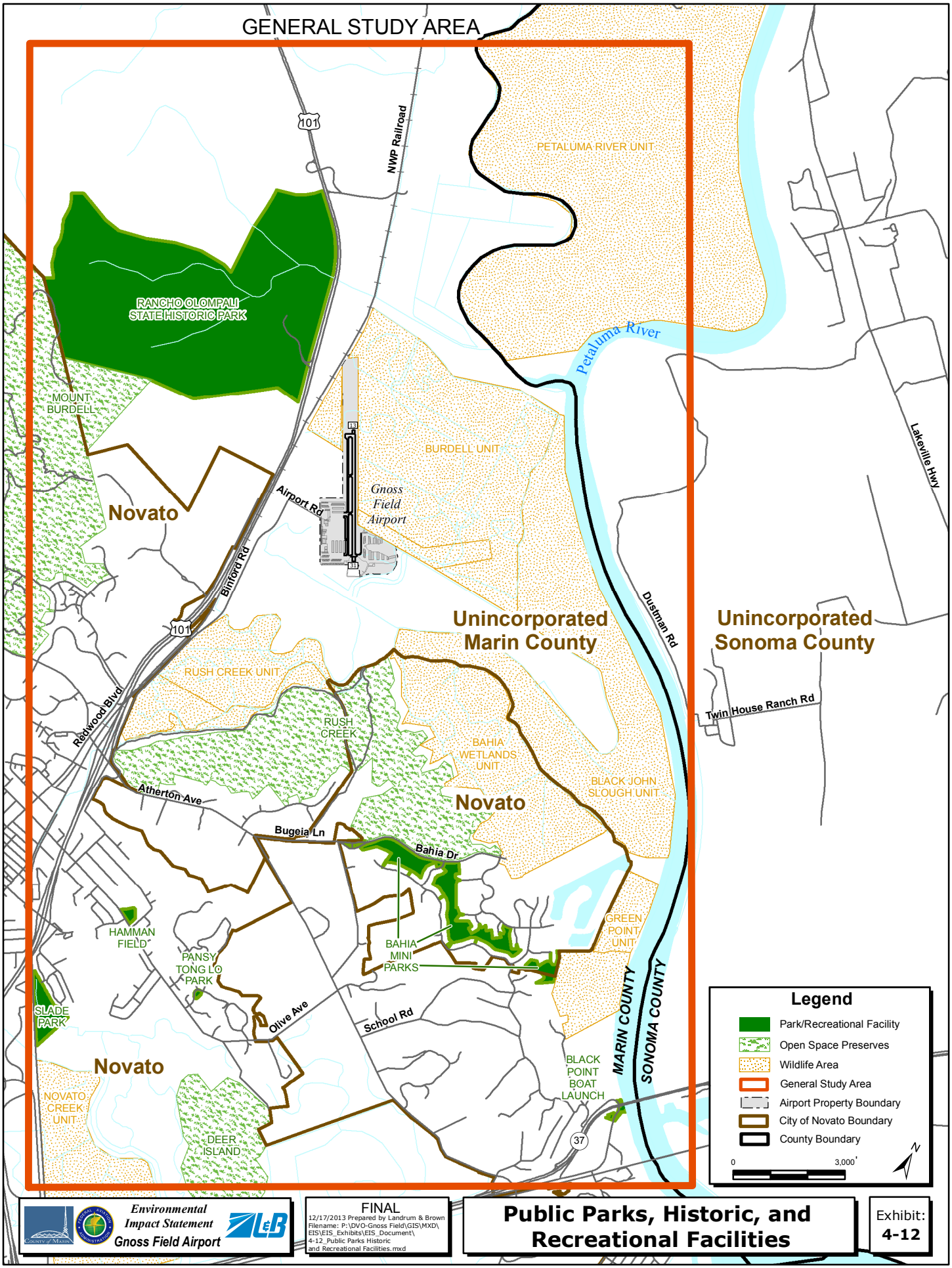
Historic Resources within the Area of Potential Effect
Exhibit: 4-13


GENERAL STUDY AREA
101
NWP Railroad
PETALUMA RIVER UNIT
RANCHO OLOMPALI STATE HISTORIC PARK
Petaluma River
MOUNT BURDELL
BURDELL UNIT
Gnoss Field Airport
Airport Rd
Novato
Binford Rd
101
Unincorporated Marin County
Unincorporated Sonoma County
Lakeville Hwy
Dustman Rd
RUSH CREEK UNIT
Redwood Blvd
RUSH CREEK
Twin House Ranch Rd
BAHIA WETLANDS UNIT
BLACK JOHN SLOUGH UNIT
Atherton Ave
Novato
Bugeja Ln
Bahia Dr
HAMMAN FIELD
PANSY TONG LO PARK
BAHIA MINI PARKS
GREEN POINT UNIT
SLADE PARK
Olive Ave
School Rd
MARIN COUNTY
SONOMA COUNTY
Novato
BLACK POINT BOAT LAUNCH
NOVATO CREEK UNIT
DEER ISLAND
37
Legend
Park/Recreational Facility
Open Space Preserves
Wildlife Area
General Study Area
Airport Property Boundary
City of Novato Boundary
County Boundary
0
3,000'
Environmental Impact Statement
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Filename: P:\DVO-Gnoss Field\GIS\MXD\EIS\EIS_Exhibits\EIS_Document\4-12_Public Parks Historic and Recreational Facilities.mxd
Public Parks, Historic, and Recreational Facilities
Exhibit: 4-12

The State of California Native American Heritage Commission (NAHC) was contacted as part of the development process of this EIS with a request for a query of the Sacred Lands File and a list of Native American contacts (see Appendix H for Native American consultation documentation). The NAHC indicated that a records search of the Sacred Lands File revealed that no Native American Cultural Resources have been recorded within the Direct or Indirect APEs.

A field survey of the Direct APE associated with the Sponsor's Proposed Project was conducted in May 2008 and a field survey of the entire Direct APE was conducted in September 2009. Through each survey, there were no observed surficial prehistoric, ethnohistoric, or historic cultural resources. To determine if subsurface cultural materials were present, shovel test probes (STPs) were excavated at various locations within the survey area. No subsurface cultural materials were observed within any of the STP locations (see Appendix H).

4.8 ENERGY SUPPLY AND NATURAL RESOURCES

4.8.1 ENERGY SUPPLY

The existing electricity infrastructure, as well as natural gas infrastructure are provided to DVO and other customers within Marin County by Pacific Gas and Electric (PG&E); a company that provides electricity and natural gas to most of northern and central California. PG&E generates electricity from hydropower stations, gas-fired steam turbines, and Diablo Canyon Nuclear Power Plant, located in San Luis Obispo County. In addition PG&E buys electricity from other in-state and out-of-state generators.[46] PG&E has 68 hydroelectric powerhouses with a total generating capacity of 3,896 megawatts (MWs). PG&E's Diablo Canyon Power Plant, which is located in San Luis Obispo County, provides electricity for more than three million people in northern and central California from its two nuclear powered 1,100 megawatt units.[47] In 2007, PG&E's total electricity generating capacity was over 6,500 MWs.[48] In May 2010, the Marin Energy Authority gained the ability to buy electricity on the free market and have it delivered to its residents over the existing infrastructure owned by the local utility company. This is made possible by Community Choice Aggregation, which results from a State of California law passed in 2002. The electricity provided to Marin County customers is largely generated from renewable sources.[49]

[46] Pacific Gas & Electric. PG&E's Electric System. Available online at: http://www.pge.com/myhome/edusafety/systemworks/electric/. Retrieved October 8, 2013.

[47] Pacific Gas & Electric. Diablo Canyon Fact Sheet, March, 2001. Available online at: http://www.pge.com/myhome/edusafety/systemworks/dcpp/about/ Retrieved October 8, 2013.

[48] Energy Information Administration. Form EIA-860 Database Annual Electric Generator Report, February, 2009. Available online at: http://www.eia.doe.gov/cneaf/electricity/page/eia860.html. Retrieved October 19, 2011.

[49] Marin County presents possible model for beefing up clean energy in Boulder, Colorado Daily, May 22, 2010. On-line at: www.coloradodaily.com. Retrieved October 19, 2011.

Electricity usage at DVO averages 178 Kilowatt hours (KWH) per day.[50] In 2007, PG&E provided nearly 515,000 million cubic feet (MMCF) of natural gas[51] to more than four million customers.[52] On average, DVO uses 1,000 cubic feet of natural gas per day for heating during the winter months.[53]

Aviation fuel is offered by concession at DVO in both 100 Low-Lead (LL) for piston-engine aircraft and Jet-A grade for turbo-prop and turbojet-engine aircraft. Total fuel consumption at DVO in 2008 was approximately 75,000 gallons of 100LL and 168,000 gallons of Jet-A. The peak monthly fuel consumption in 2008 was 8,590 gallons of 100LL and 19,654 gallons of Jet-A.[54]

4.8.2 GEOLOGY/NATURAL RESOURCES

DVO lies within the Petaluma River Valley approximately two feet above sea level. The geology of the DSA is characterized by soils deposited within the San Pablo Bay drainage basin during the late Holocene Epoch (less than 11,500 years ago).[55] DVO is not located within any current fault hazard zone subject to the provisions of the Alquist-Priolo Earthquake Fault Zoning Act.[56] DVO is adjacent to the Burdell Mountain Fault, a Quarternary active fault that has not experienced ground rupture in an earthquake since 1776.[57] There are no known historic or active mines, nor any known precious metals or mineral deposits, nor any oil or gas fields located within or near the DSA.

4.8.3 SOILS

Soils within the DSA are predominately Reyes clay, which is a somewhat poorly drained soil.[58] According to the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service, Reyes clay does not meet the criteria for prime farmland or farmland of statewide importance as outlined in the USDA's Land Inventory and Monitoring project for the Marin County Soil Survey.[59] See **Exhibit 4-14, *Site Soils***, for locations of soil types within the DSA.

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50 Data provided by the Marin County Public Works Department.

51 Energy Information Administration. EIA-176 Query System. Available online at: http://www.eia.doe.gov/oil_gas/natural_gas/applications/eia176query.html. Retrieved October 19, 2011.

52 Pacific Gas & Electric, PG&E's Natural Gas System Overview. Available online at: http://www.pge.com/myhome/edusafety/systemworks/gas/overview/. Retrieved October 8, 2013.

53 Data provided by the Marin County Public Works Department, 2009.

54 Data provided by the Marin County Public Works Department. 2009.

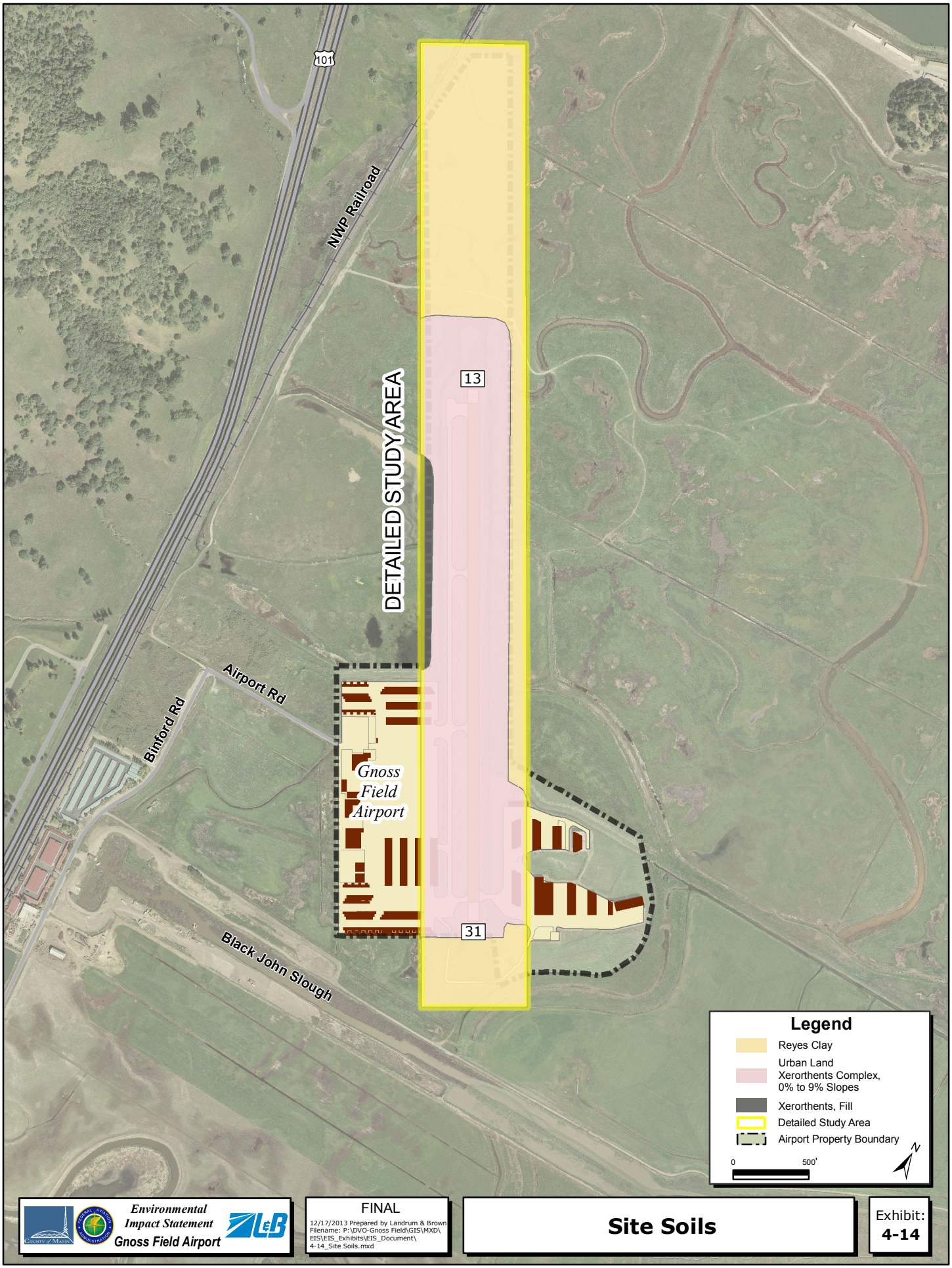
55 U.S. Department of Interior, U.S. Geological Survey, Geologic Map of the San Francisco Bay Region, 2006.

56 California Geological Survey, Fault Rupture Hazard Zones in California, 1997

57 U.S. Department of Interior, U.S. Geological Survey, Map of Quarternary Active Faults in the San Francisco Bay Region, 2006.

58 U.S. Department of Agriculture, Natural Resources Conservation Service, Soil Survey Geographic (SSURGO) database for Marin County, California, 10/12/2007.

59 California Department of Conservation. Farmland Mapping and Monitoring Program: Soil Candidate Listing for Prime Farmland and Farmland of Statewide Importance, Marin County, 7/06/2004.



Environmental Impact Statement
Gnoss Field Airport

FINAL

12/17/2013 Prepared by Landrum & Brown
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Site Soils

Exhibit: **4-14**

4.9 FISH, WILDLIFE, AND PLANTS

Biotic communities at and in the vicinity of DVO were surveyed as part of this environmental analysis. The full report is included in Appendix I, *Biological Resources,* of this document.[60] Two major biological communities occur within the immediate vicinity of DVO including annual grassland and high brackish marsh. Within these two primary communities are also some additional wetland communities. These communities provide habitat to a number of common species of wildlife and may provide suitable habitat for special-status species. Each of the biological communities including associated common plant and wildlife species observed, or that are expected to occur within these communities are described in the following discussions. Locations of biotic communities and wildlife habitats within the DSA are shown in **Exhibit 4-15, *Vegetation and Wildlife Habitats***.

4.9.1 ANNUAL GRASSLAND

Annual Grassland is the dominant upland plant community within the DSA (see Exhibit 4-14, *Vegetation and Wildlife Habitats*). Annual grassland is characterized primarily by an assemblage of non-native grasses and forbs and typically supports breeding, foraging, and shelter habitat for several species of wildlife. Species observed or expected to occur in this habitat include savannah sparrow (*Passerculus sandwichensis*), western meadowlark (*Sturnella neglecta*), white-tailed kite (*Elanus leucurus*), western burrowing owl (*Athene cunicularia hypugaea*), northern harrier (*Circus cyaneus*), black-tailed jackrabbit (*Lepus californicus*), and gopher snake (*Pituophis melanoleucus*).[61]

4.9.2 HIGH BRACKISH MARSH

High Brackish Marsh, a wetland community, is the major plant community within the DSA outside of the developed airfield. Lesser amounts of other wetland types are also present as described in Section 4.5.2, Wetlands and Other Waters of the U.S. High Brackish Marsh typically supports breeding and foraging habitat for a variety of wildlife. Species observed within this community include northern harrier (Circus cyaneus), red-winged blackbird (Agelaius phoeniceus), short-eared owl (Asio flammeus), black necked stilt (Himantopus mexicanus), killdeer (Charadrius vociferus), marsh wren (Cistothorus palustris), and San Pablo song sparrow (Melospiza melodia samuelis).[62,63]

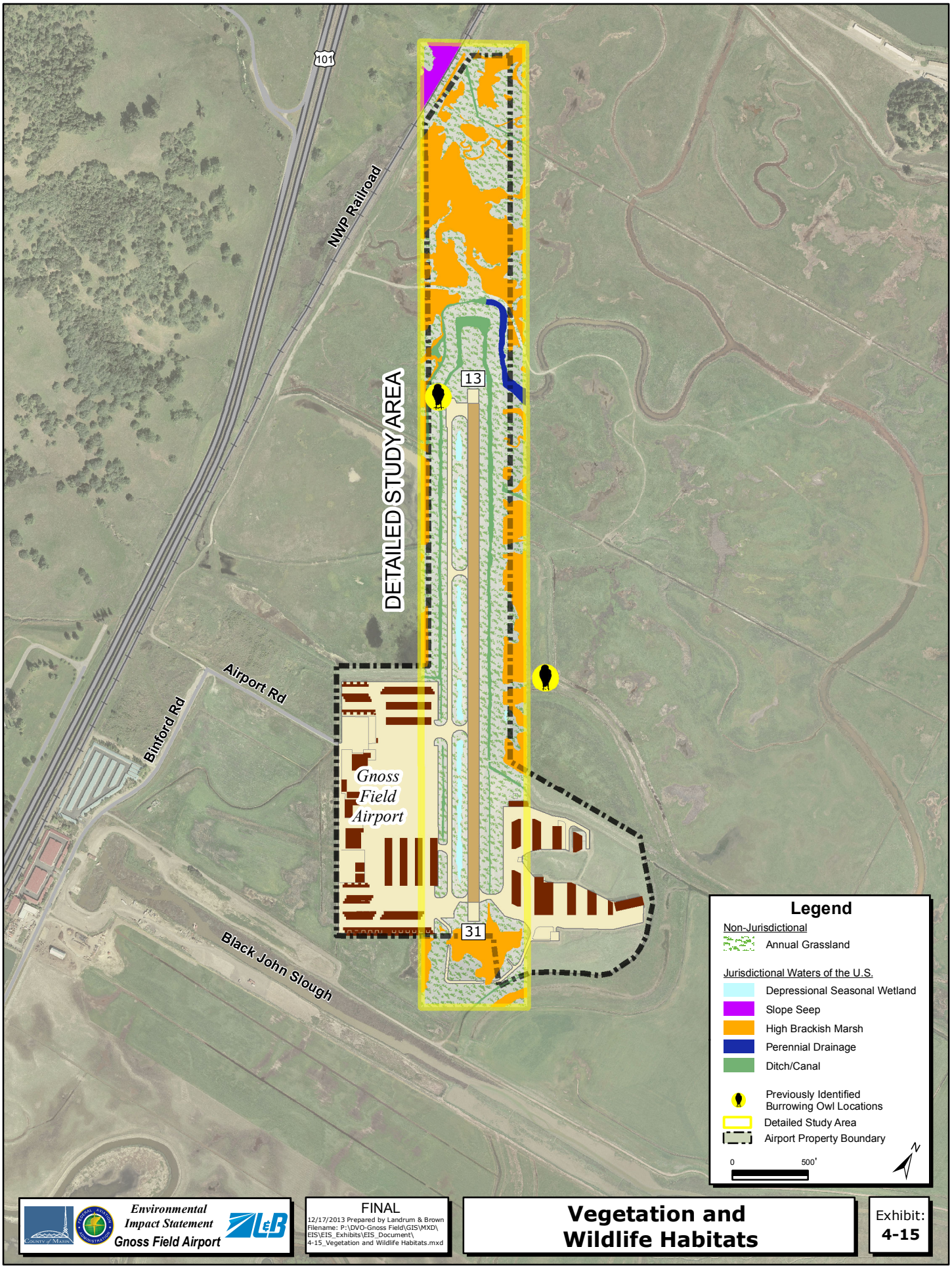
[60] Foothill Associates, *Biological Resources Assessment, Marin County Airport*, 2011. See Appendix I.
[61] Foothill Associates, *Biological Resources Assessment, Marin County Airport*, 2011. See Appendix I.
[62] Foothill Associates, *Biological Resources Assessment, Marin County Airport*, 2011. See Appendix I.
[63] The marsh wren and San Pablo song sparrow are not typically associated with high brackish marsh habitat, but were observed by the biologists during the site visit.

4.9.3 SPECIAL STATUS SPECIES

Special-status species are plant and animal species that have been afforded special recognition by Federal and/or state agencies or organizations. Listed and special-status species are of relatively limited distribution and may require specialized habitat conditions. Special-status species are defined as meeting one or more of the following criteria:

- Listed as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS);
- Listed as threatened or endangered under the California Endangered Species Act or otherwise fully protected under California state law; or
- Protected under other regulations, such as the Migratory Bird Treaty Act (MBTA).

Special-status species considered for this analysis are based on a USFWS list of Federally threatened or endangered species; Federally designated critical habitat that could potentially be affected by the project; and query of the California Department of Fish and Game's (CDFG) California Natural Diversity Data Base (CNDDB) for the Petaluma River quadrangle and the eight surrounding quadrangles. **Tables 4-13** and **4-14** include the common names and scientific names for each Federal and State of California threatened or endangered plant and wildlife species, respectively, and their potential for occurrence within the DSA.



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Vegetation and Wildlife Habitats

Exhibit: **4-15**

Table 4-13
FEDERALLY THREATENED AND ENDANGERED SPECIES THAT OCCUR OR HAVE THE POTENTIAL TO OCCUR WITHIN THE DETAILED STUDY AREA
Gnoss Field Airport

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	POTENTIAL HABITAT IN DSA	POTENTIAL FOR OCCURRENCE IN DSA
PLANTS				
Soft bird's beak	*Cordylanthus mollis ssp. mollis*	Endangered	Marginal potential habitat in DSA	Concluded species is absent based on negative species survey in DSA.
WILDLIFE				
Birds				
California clapper rail	*Rallus longirostris obsoletus*	Endangered	Habitat is present in DSA	USFWS has determined that the area of the proposed runway extension is habitat for the California clapper rail. The FAA concurred with this determination. Suitable marsh habitat for this species exists to the south of the study area and the species could seasonally (winter) forage within the survey area.
Animals				
Salt marsh harvest mouse	*Reithrodontomys-raviventris*	Endangered	Habitat is present in DSA	USFWS has determined that the brackish marsh area north of the proposed runway extension is habitat for the salt marsh harvest mouse. The FAA concurred with this determination. Marginal habitat for this species occurs within the study area, specifically within the areas of man-made drainage, which provide (limited) connectivity with suitable habitats adjacent to the Petaluma River and east of a levee used to isolate the Airport from tidal flows and processes. Although pickleweed is present in the DSA, it does not contain pickleweed-dominated marsh. Rather, the marsh is dominated by saltgrass and alkali heath.

Table 4-13, *Continued*
FEDERALLY THREATENED AND ENDANGERED SPECIES THAT OCCUR OR HAVE THE POTENTIAL TO OCCUR WITHIN THE DETAILED STUDY AREA
Gnoss Field Airport

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	POTENTIAL HABITAT IN DSA	POTENTIAL FOR OCCURRENCE IN DSA
Amphibians/Reptiles				
California red-legged frog	*Rana aurora draytonii*	Threatened	Habitat is present in DSA during winter months	There is low potential for the frog to be present onsite during winter months as a result of dispersing from adjacent localized freshwater habitat areas. If the species migrates into the site outside of the winter months (i.e., during the region's dry period), it is not anticipated to survive.

Source: Foothill Associates, *Biological Resources Assessment, Marin County Airport*, 2011. See Appendix I.

Table 4-14
STATE OF CALIFORNIA SPECIES WITH SPECIAL STATUS THAT OCCUR OR HAVE THE POTENTIAL TO OCCUR WITHIN THE DETAILED STUDY AREA
Gnoss Field Airport

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	STATE STATUS	POTENTIAL HABITAT IN DSA	POTENTIAL FOR OCCURRENCE IN DSA
PLANTS					
Soft bird's beak	*Cordylanthus mollis ssp. mollis*	Endangered	CR	Marginal potential habitat in DSA	Concluded species is absent based on negative species survey in DSA.
WILDLIFE					
Birds					
California clapper rail	*Rallus longirostris obsoletus*	Endangered	CFP	Habitat is present in DSA	USFWS has determined that the area of the proposed runway extension is habitat for the California clapper rail. The FAA concurred with this determination. Suitable marsh habitat for this species exists to the south of the study area and the species could seasonally (winter) forage within the survey area.
Loggerhead shrike	*Lanius ludovicianus*	--	CSC	Marginal potential habitat in DSA	Concluded species is unlikely to occur in the DSA based on the absence of suitable habitat.
Northern harrier	*Circus cyaneus*	--	CSC	Habitat is present in DSA	Concluded species are present based on positive species survey in DSA.
San Pablo song sparrow	*Melospiza melodia samuelis*	--	CSC	Habitat is present in DSA	Concluded species are present based on positive species survey in DSA

Table 4-14, *Continued*
STATE OF CALIFORNIA SPECIES WITH SPECIAL STATUS THAT HAVE THE POTENTIAL TO OCCUR WITHIN THE DETAILED STUDY AREA (DSA)
Gnoss Field Airport

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	STATE STATUS	POTENTIAL HABITAT IN DSA	POTENTIAL FOR OCCURRENCE IN DSA
Birds, *Continued*					
Tricolored blackbird	*Agelaius tricolor*	--	CSC	Marginal potential habitat in DSA	Concluded species is unlikely to occur in the DSA based on the absence of suitable habitat.
Western burrowing owl	*Athene cunicularia hypugaea*	--	CSC	Habitat is present in DSA	Concluded species are present based on positive species survey in DSA.
White-tailed kite	*Elanus leucurus*	--	CFP	Habitat is present in DSA	Concluded species are present based on positive species survey in DSA.
Other Raptors (Hawks, Owls and Vultures)		Protected under Migratory Bird Treaty Act (MBTA)	Protected under Section 3503.5 of the California Fish and Game Code	High potential habitat in DSA	Concluded species are present based on positive species survey in DSA.
Animals					
American badger	*Taxidea taxus*	--	CSC	Marginal potential habitat in DSA	Concluded species is unlikely to occur in the DSA based on the absence of suitable habitat.
Pallid bat	*Antrozous pallidus*	--	CSC	Marginal potential habitat in DSA	Concluded species is unlikely to occur in the DSA based on the absence of suitable habitat.

Table 4-14, *Continued*
STATE OF CALIFORNIA SPECIES WITH SPECIAL STATUS THAT HAVE THE POTENTIAL TO OCCUR WITHIN THE DETAILED STUDY AREA (DSA)
Gnoss Field Airport

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	STATE STATUS	POTENTIAL HABITAT IN DSA	POTENTIAL FOR OCCURRENCE IN DSA
Animals, *Continued*					
Salt marsh harvest mouse	Reithrodontomys -raviventris	Endangered	CFP	Habitat is present in DSA	USFWS has determined that the brackish marsh area north of the proposed runway extension is habitat for the salt marsh harvest mouse. The FAA concurred with this determination. Marginal habitat for this species occurs within the study area, specifically within the areas of man-made drainage, which provide (limited) connectivity with suitable habitats adjacent to the Petaluma River and east of a levee used to isolate the Airport property from tidal flows and processes. Although pickleweed is present in the DSA, it does not contain pickleweed-dominated marsh. Rather, the marsh is dominated by saltgrass and alkali heath.

Table 4-14, *Continued*
STATE OF CALIFORNIA SPECIES WITH SPECIAL STATUS THAT HAVE THE POTENTIAL TO OCCUR WITHIN THE DETAILED STUDY AREA (DSA)
Gnoss Field Airport

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	STATE STATUS	POTENTIAL HABITAT IN DSA	POTENTIAL FOR OCCURRENCE IN DSA
Animals, *Continued*					
Townsend's big-eared Bat	*Corynorhinus townsendii*	--	CSC	Marginal potential habitat in DSA	Concluded species is unlikely to occur in the DSA based on the absence of suitable habitat.
Amphibians/Reptiles					
California red-legged frog	*Rana aurora draytonii*	Threatened	CSC	Habitat is present in DSA during winter months	There is low potential for the frog to be present onsite during winter months as a result of dispersing from adjacent localized freshwater habitat areas. If the species migrates into the site outside of the winter months (i.e., during the region's dry period), it is not anticipated to survive.

KEY:

State of California Classifications: CFP = California Fully Protected; **CSC** = California Species of Special Concern; **CR** = California State Rare;

Source: Foothill Associates, *Biological Resources Assessment, Marin County Airport*, 2011. See Appendix I

4.9.3.1 Plants

FEDERALLY THREATENED AND ENDANGERED PLANT SPECIES

Based on the USFWS list, special-status plant species have the potential to occur onsite or in the vicinity of the DSA. However, based on field observations and literature review specific to the special-status plants listed in Table 4-13, no Federally threatened or endangered plant species are known to be present or are considered to have a high potential to occur within the DSA. The late blooming plant species that is considered to have a low potential to occur onsite is the soft bird's beak (*Cordylanthus mollis* ssp*. mollis*). Surveys to identify the presence of soft bird's beak were performed on the site in March 2008, July 2009, and July, August, and September of 2010. No occurrences of soft bird's beak were found during these surveys (see Appendix I). Based upon the lack of observed occurrence, the marginally-suitable nature of the available habitat on-site (primarily due to the alteration of the site's hydrologic and plant community structure by surrounding levees), and the fact that the majority of the potential habitat is within a highly disturbed, actively grazed, non-native agricultural community, it has been concluded that this species is absent from the site.[64]

STATE OF CALIFORNIA THREATENED AND ENDANGERED PLANT SPECIES

Based on a records search of the CNDDB, special-status plant species have the potential to occur onsite or in the vicinity of the DSA. However, based on field observations and literature review specific to the special-status plants listed in Table 4-14, no State of California threatened or endangered plant species are known to be present or are considered to have a high potential to occur within the DSA. The late blooming plant species that are considered to have a low potential to occur on-site is the soft bird's beak (*Cordylanthus mollis* ssp*. mollis*). Surveys to identify the presence of soft bird's beak were performed on the site in March 2008, July 2009, and July, August, and September of 2010. No occurrences of soft bird's beak were found during these surveys (see Appendix I). Based upon the lack of observed occurrence, the marginally-suitable nature of the available habitat on-site (primarily due to the alteration of the site's hydrologic and plant community structure by surrounding levees), and the fact that the majority of the potential habitat is within a highly disturbed, actively grazed, non-native agricultural community, it has been concluded that this species is absent from the site.[65]

OTHER PLANT SPECIES OF CONCERN

Through the tribal coordination process as part of this document, the FAA and Marin County held a meeting in December 2008 with representatives of the Federated Indians of Graton Rancheria (FIGR) (see Appendix H). At that meeting, FIGR representatives identified 42 native plant species that they consider to be to be sacred and culturally significant. Of the 42 plant species identified by the FIGR as sacred and culturally significant, one species, the Showy Indian Clover (*Trifolium amoenum*), is both a Federal and State of California threatened or endangered

[64] Foothill Associates, *Biological Resources Assessment, Marin County Airport*, 2011. See Appendix I.
[65] Foothill Associates, *Biological Resources Assessment, Marin County Airport*, 2011. See Appendix I.

plant species. However, based on field observations and literature review specific to the special-status plant species, it was determined that the DSA does not contain suitable habitat for this species.[66] The remaining plant species identified by the FIGR are not Federally or State of California threatened or endangered species.

4.9.3.2 Wildlife

FEDERALLY THREATENED AND ENDANGERED WILDLIFE

Based on a records search of the CNDDB, the USFWS list, and informal consultation with the USFWS, no special-status animal species are known to occur on the site or in the immediate vicinity of DVO. However, based Endangered Species Act Section 7 consultation between the USFWS and the FAA, the FAA determined in its Biological Assessment (Appendix I) that the brackish marsh areas that surround the Airport should be considered marginal habitat for the Federally-endangered salt marsh harvest mouse (*Reithrodontomys raviventris*) and for the Federally-endangered California clapper rail (*Rallus longirostris obsoletus*). Also based on the Endangered Species Act, Section 7, consultation between the USFWS and the FAA, the FAA also determined in its Biological Assessment (Appendix I) there is low potential for the California red-legged frog (*Rana aurora draytonii)* to be present onsite during the winter months.

STATE OF CALIFORNIA THREATENED AND ENDANGERED BIRD AND ANIMAL SPECIES

Special-status animal species have the potential to occur onsite or in the vicinity of DVO based on a records search of the CNDDB. Based on field observations and literature review specific to the special-status animals listed in Table 4-14, State of California threatened or endangered species that are known to be present or that are considered to have a potential to occur onsite include California clapper rail (*Rallus longirostris obsoletus*), northern harrier (*Circus cyaneus*), San Pablo song sparrow (*Melospiza melodia samuelis*), western burrowing owl (*Athene cunicularia hypugaea*), white-tailed kite (*Elanus leucurus*), and other raptors, as well as the salt marsh harvest mouse (*Reithrodontomys raviventris*). The species that are considered to have a low potential onsite include loggerhead shrike (*Lanius ludovicianus*), tricolored blackbird (*Agelaius tricolor*), American badger (*Taxidea taxus*), pallid bat (*Antrozous pallidus*), and Townsend's big-eared bat (*Corynorhinus townsendii*).

[66] Foothill Associates, *Biological Resources Assessment, Marin County Airport*, 2011. See Appendix I.

4.9.3.3 Federally and State Threatened and Endangered Fish Species

The Proposed Project is located on the inland side of levees that separate the runway extension project area from the Petaluma River and San Pablo Bay. Coordination with the USFWS[67] and NMFS[68] confirmed that there no Federally threatened or endangered fish species would be expected to occur in the runway extension project area or be affected by the Proposed Project (see Appendix I). The NMFS also stated that the Proposed Project would not affect Essential Fish Habitat as defined by the Magnuson-Stevens Fishery Conservation and Management Act. No State of California threatened or endangered fish species occur in the runway extension project area.

[67] Foothill Associates, *Biological Resource Assessment, Gnoss Field Airport, Marin County, California,* 2011. See Appendix I.

[68] Letter from National Marine Fisheries Service to Federal Aviation Administration, March 5, 2010 (see Appendix I for copy of letter).

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